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Original Articles

CLINICAL NOTES ON MALIGNANT TUMORS OF LONG BONES.*

By JAMES BERRY, B.S., F.R.C.S.,

Senior Surgeon, Royal Free Hospital, London; Consulting Surgeon, Alexandra Hospital for Children with Hip Disease.

Malignant tumors of bone are so common, their results usually so terribly serious, the difficulties of diagnosis often so great, and mistakes in diagnosis unfortunately so frequent, that the subject has for me always possessed unusual interest. When, therefore, I received the kind invitation of your secretary to address the Northumberland and Durham Medical Society, I chose for my subject that of malignant tumors of bone.

I do not propose to attempt any exhaustive or complete survey of so vast a subject, but rather to relate to you a selection of clinical cases that have come under my own notice in the course of the last thirty years. Many of these occurred in my own practice, others came under my observation during the twenty and more years that I spent, in various capacities, at St. Bartholomew's Hospital.

In order to illustrate my subject, I propose to show you a few museum specimens from the Royal Free Hospital, and from your own excellent Pathological Museum in Newcastle, and also to put before you a series of photographs, chiefly of specimens from St. Bartholomew's and the Royal Free Hospital Museums, as well as a number of radiograms that have been kindly lent me by my friends, Mr. Archibald Reid and Mr. Gilbert Scott, radiographers respectively to St. Thomas's and the London Hospitals.

Both carcinoma and sarcoma affect bone, but I need not remind you it is sarcoma alone that can occur as a primary tumor in this tissue. Carcinoma being an epithelial structure, does not and cannot develop primarily in bony tissue.

Carcinoma may involve bone in one or other of two ways. First, by *direct extension,* as in the case of cancer of the breast invading the ribs; epithelioma of the tongue involving the jaw; or an epitheliomatous ulcer of the leg growing into the tibia. But with these I am not concerned to-day, since it is not for the bone affection, but for the disease of the soft parts that the patient usually seeks advice.

The second form in which carcinoma attacks bone, namely as a *secondary deposit,* belongs more properly to our subject. It is of much importance because of its frequent association with spontaneous fracture, which indeed is often the first indication that the patient has anything the matter with him.

The importance, in regard to prognosis, of the true nature of such a fracture is obvious. Of the many instances that have come under my notice, let me briefly mention two. One is the case of a middle-aged woman whom I saw a year or two ago, with Dr. de Segundo, on account of a recent fracture of the thigh bone, caused apparently by a fall downstairs. There was no obvious tumor, nor was there any previous history of pain or other evidence of disease in the bone. But the manner of her fall, without any apparent reason for it, together with the important fact that she had some little time before suffered amputation of the breast for carcinoma, led to an x-ray photograph being taken. This disclosed a small area of disease in the bone itself, and the diagnosis of a secondary carcinoma was clear, the patient dying of the disease a few months later.

The other case came under my notice when I was Surgical Registrar at St. Bartholomew's Hospital, and is remarkable for the fact that the existence of a malignant growth was never even suspected until the post-mortem examination was made.

An old man was admitted to hospital with what

* Abridged from an address delivered at Newcastle-on-Tyne, to the Northumberland and Durham Medical Society, on October 9, 1913.

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appeared to be an ordinary fracture of the upper third of the femur. It was put up in the ordinary way, but the man did not do well; he soon developed bronchitis and died a few weeks after admission, the fracture never having united. When I came to make the post-mortem I found a nodule of soft epitheliomatous growth, not much larger than a hazel nut, inside the medullary cavity at the seat of fracture. At the lower end of the esophagus was a large malignant ulcer, which had not caused any appreciable obstruction or any other symptoms. I subsequently questioned the sister of the ward very carefully, and learned that the only occasion on which the patient had made any allusion to difficulty in swallowing was on the day before his death, when he had refused his dinner, saying he could not eat it.



Fig. 1. Section of a typical periosteal sarcoma of the femur (very malignant). Note the extension of the growth into the cancellous tissue and the characteristic sharp outline of compact bone running through the center of the upper part of the tumor.—St. Bartholom. Hosp. Mus.

I need scarcely add that this case occurred long before the days of x-rays.

[Three radiograms illustrating secondary carcinoma of bone were then shown.]

Of the next three slides which I put before you, the first shows a radiogram of the upper end of a femur. The well-defined pale area indicates absorption of bone caused by a secondary malignant tumor. But without clinical history and comparison with a radiogram of the opposite limb, it would be difficult or impossible to make a certain diagnosis, since other causes may produce a very similar condition of atrophy.

The next slide shows a secondary growth in the femur, which has caused spontaneous fracture. The condition is almost identical with that of the preceding case. You will note the clear area of growth in the centre of the bone and the characteristic superficial erosion of the adjoining ends of the bones.

The next is a similar affection of the humerus, the disease being well marked; but spontaneous fracture has not yet occurred.

I pass now to primary *sarcoma* of bone, and in dealing with this I shall refer mainly to tumors of the long bones.

Here are some typical examples of museum specimens of periosteal sarcoma (Figs. 1, 2, 4, 5, 10, 11, 13, 14).

Whatever may be our views as to the exact mode of origin of the so-called periosteal sarcoma, whatever we may think of the relation of the so-called myeloma to the other forms of endosteal tumors of bone, there is one great fact of practical importance



Fig. 2. Periosteal sarcoma of femur. Note the extension of the tumor into the cancellous tissue, and the sharp outline of compact tissue running through the upper part of the tumor.—Royal Free Hosp. Mus.

that stands out prominently and should never be lost sight of. That fact is that the so-called periosteal sarcoma, with rare exceptions, is a terribly malignant disease, and that the great majority of endosteal tumors (always, of course, excepting the secondary carcinomas) are very much less malignant, the true myeloma being practically an innocent tumor.

Hence the great importance clinically of diagnosing between periosteal and endosteal tumors. I am, of course, aware that there are such things as round and spindle-celled endosteal tumors of high malignancy, of some of which I will show you skiagrams.

Here, for instance, is a spindle-celled sarcoma of the interior of the shaft of the femur, obviously of greater malignancy than any ordinary myeloma.

About the exact pathological position of some of the central tumors of the shaft there is still much uncertainty.

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An interesting case which occurred in my own practice many years ago, was that of a boy who admitted to the Royal Free Hospital with a spontaneous fracture of the middle of the tibia; there was an obvious swelling of the bone at the seat of fracture. I cut down at once upon it, and found a firm whitish tumor about as large as a walnut, entirely limited to the medullary cavity, and exceedingly well marked off from the surrounding healthy bone.

With the enthusiasm of youth, I determined to attempt to save the limb, and did a very thorough erasion. To my horror, in about ten days' time, the whole wound was covered with little round knobs of recurrent growth. I hastily amputated through the knee, and the boy remained quite well

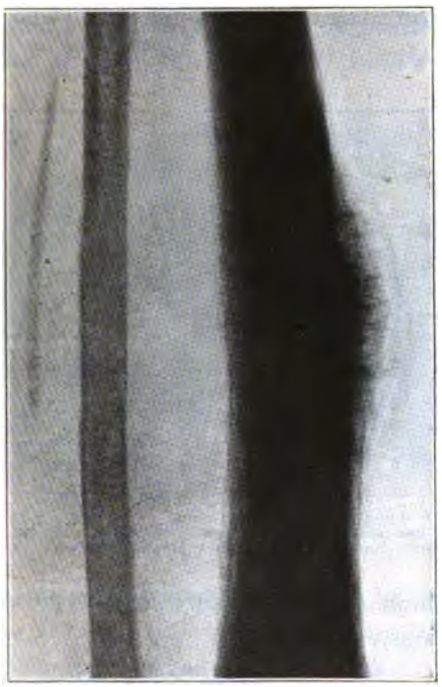


Fig. 3. Radiogram of a typical periosteal sarcoma of the tibia. Note the delicate spicules and islands of bone perpendicular to the surface of the shaft.—Kindly lent by Mr. S. Gilbert Scott.

for several years afterwards. I used to see him from time to time, but I then lost sight of him and cannot ascertain whether he is now alive or dead.

Here is another skiagram of an endosteal tumor somewhat more malignant than an ordinary myeloma. Microscopically it was a spindle-celled sarcoma.

The clinical diagnosis between periosteal and endosteal tumor is generally not very difficult, even without the help of x-rays, at least at the stage at which such tumors are usually seen by hospital surgeons.

In the earlier stages, without x-rays, and often even with their help, diagnosis may be quite impossible without an exploratory incision and microscopical examination. Even then, difficulties may arise. In the earliest stages the symptoms are so slight; perhaps a little dull, continuous pain—never severe unless it happens that the tumor arises in the neighborhood of a large nerve, as with some tumors of the jawbones and most tumors of the vertebral column. There is, perhaps, a little swelling of the bone, perhaps a little tenderness, but not much—perhaps a superficial vein may be enlarged over the seat of swelling. If the tumor be a periosteal one, affecting a superficial bone like the tibia, so that the physical signs are easily detected, diagnosis ought to be made much earlier than it usually is.



Fig. 4. Typical periosteal sarcoma of tibia in a boy aged 12 (macerated specimen). The delicate lamellæ and spicules of bone are characteristic of this disease.—St. Bartholom. Hosp. Mus.

The prominence of the tumor, its hardness and fixity, the abruptness of its edge, never overhanging, as in the case of the still more common exostosis, ought to raise a strong suspicion of malignancy, and at this early stage a good x-ray photograph will often clear away all doubt. Let me here insist on the value of having really good x-ray photographs, and if possible stereoscopic views, in the diagnosis of malignant tumors of bone. It is *detail* that is required for diagnosis of the exact nature of the tumor.

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The next eight slides (see Fig 3) illustrate radiograms showing absolutely typical periosteal sarcomata, all of a high degree of malignancy. In these cases the diagnosis can be made from the radiograms themselves, without clinical history, although it is not usually wise to attempt to do so. In fact the clinical history of many of the patients from whom these radiograms were taken is unknown to me.

[A description was then given of each of these slides, attention being drawn to the characteristic radiating spicules and lamellæ of bone (see Figs. 3, 4, 5), to the islands of bony tissue disseminated through the tumor, and the manner in which a



Fig. 5. Typical periosteal sarcoma of tibia. Another view of case shown in Fig. 4.

shadowy outline of the original surface of the shaft of the bone can be traced through it (See Figs. 1, 2, 3).]

The next slide (Fig. 6) shows a museum specimen of *chondro-sarcoma*, and leads me to remark that the presence of cartilaginous or bony or other innocent connective tissue in a sarcomatous tumor does not by any means indicate that it is necessarily less malignant. Chondromata, especially when single and of recent duration, should always be looked upon with considerable suspicion; and even when they are to the naked eye apparently quite innocent, they should always be submitted to a careful microscopic examination by a competent pathologist.

Here are two radiograms of apparently innocent enchondromata for comparison with the preceding.

I show you next a series of specimens and radiograms of endosteal tumors, all either quite innocent or of a very low degree of malignancy, with one spindle-celled endosteal tumor.

Fig. 7 is a good example of a typical myeloma of the head of the tibia, in a man aged 28, for which I had to do an amputation seven years ago, and who at present is alive and in good health without recurrence.

I must pass over the ordinary well-known means of diagnosing endosteal tumors clinically, such as expansion of the bone, egg-shell cracking, and the rest (Fig. 7); and also the way in which a malignant periosteal sarcoma can be distinguished from a myeloid after a section has been made of the am-



Fig. 6. Periosteal chondro-sarcoma of femur eroding bone and extending into condyles.—Royal Free Hosp. Mus.

putated limb, since the pictures I have shown make this obvious enough.

I must now, however, say a few words about the conditions likely to be mistaken for sarcoma, and to urge upon you the importance of not undertaking any extensive operation, such as amputation, for a supposed sarcoma of bone until you are *quite sure* that you have not to deal with one of the numerous conditions that simulate sarcoma.

Many an excellent surgeon has amputated a limb for a supposed sarcoma only to find that the disease was non-malignant. I know of at least four cases where that was done, and I will now show you photographs of two of the specimens (Figs. 8, 9).

It is the more quiet forms of inflammation without suppuration that are most likely to be mistaken for sarcoma. Quiet necrosis, whether of the shaft

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or of the end of a long bone, and especially tuberculous osteitis, are likely to lead to error. I have seen excision of a clavicle performed for a tumor which was supposed to be a sarcoma because the bone had undergone spontaneous fracture, and this by an eminent and experienced hospital surgeon; but the disease was merely tuberculous osteitis.

Although I have never myself had the misfortune to amputate for a supposed sarcoma which was really something less serious, I have twice come perilously near doing so, and a record of my experience may perhaps be of use to you. Some twenty years ago, an old man came under my care at the Royal Free Hospital, with a large, irregular, firm tumor at the inner side of the thigh, just above the knee; it extended forward under the vastus internus, backwards into the popliteal space; it was fixed and tender and no pulsation could be detected

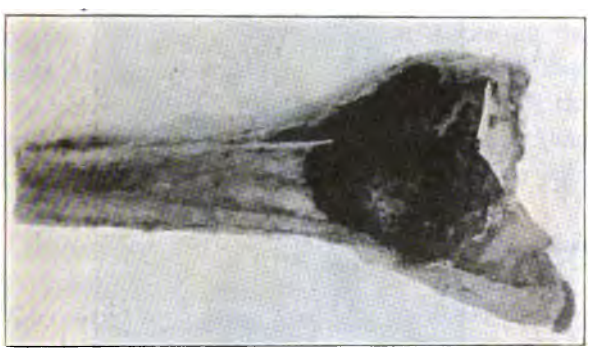


Fig. 7. Typical myeloma of head of tibia in a man, aged 28, treated by amputation. Note how the tumor has destroyed the bone right up to the articular cartilage, but without affecting the latter.—Royal Free Hosp. Mus.

in it. I discussed the diagnosis with my colleagues, and we all agreed that it was a sarcoma, and that amputation of the thigh should be performed.

The patient was already under the influence of an anesthetic, and an Esmarch's bandage had been applied, when I fortunately thought I had perhaps better cut into the tumor. I did so and found myself in a great mass of recent and old blood clot. The tumor was a large popliteal aneurism, but non-pulsating, of a kind to which Mr. Morrant Baker drew attention, years ago, in an excellent paper in St. Bartholomew's Hospital Reports, on aneurisms that do not pulsate. The explanation in this case was that the patient was a vagrant who had walked 100 miles to the hospital in three days, and had thus produced so much subacute inflammation that the blood in the aneurism had consolidated. The tumor, muscles and bone were all united by recent inflammation.

I did not amputate, but excised the whole tumor, the wound healed without any trouble, and the patient made a rapid and excellent recovery. He subsequently developed another aneurism on the popliteal of the opposite limb, which I also cured for him. I then lost sight of the patient.

The second case was the following:

Miss E. H., aged 20, consulted me in October, 1902, on account of a slight swelling in the middle of the right humerus, which she had first noticed 4½ weeks previously. A skiagram showed a clear oval space just at the insertion of the deltoid. The

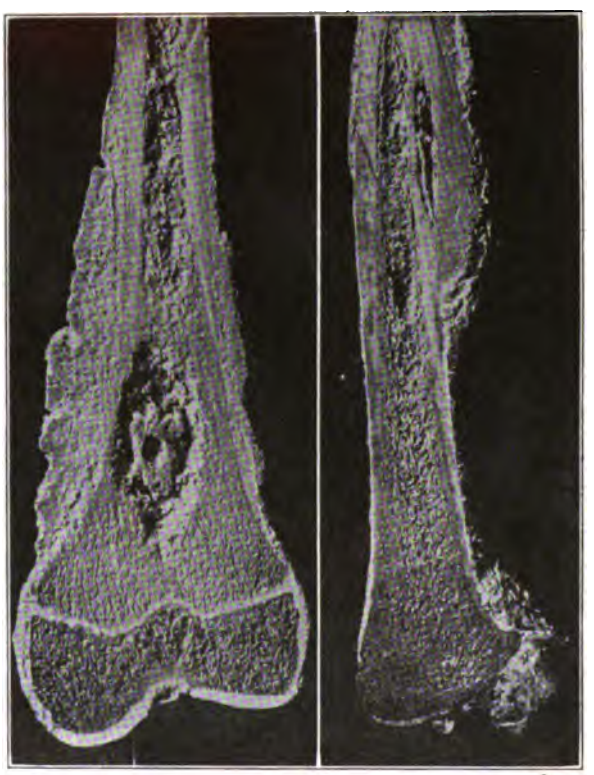


Fig. 8. Central necrosis of femur without suppuration, causing a large deposit of inflammatory bone. Mistaken for sarcoma and amputated (before the days of x-rays).—St. Bartholm. Hosp. Mus.

Fig. 9. Section of lower two-thirds of a femur, showing a small piece of necrosed bone surrounded by a mass of inflammatory new bone. The case was thought to be one of sarcoma and amputation was performed (before the days of x-rays).—St. Bartholom. Hosp. Mus.

patient was quite healthy, and there was no history of any previous injury or disease. A diagnosis of probable sarcoma was made, and after a consultation with two other surgeons, who concurred, an exploratory operation was performed. A tumor was found expanding the bone, and this fact, together with the small size of the mass which involved only about

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1½ inches of the bone, appeared to justify a local removal. Before doing this, however, I punctured the swelling with a trocar and cannula, and let out about half an ounce of clear yellow fluid from a smooth-walled cavity. The tumor was a simple cyst. The surrounding bone, which was very thin, was cut away and the cavity thoroughly scraped and packed with gauze. So much erosion of bone had occurred that a fracture took place. The wound healed without any trouble and the fracture united. The arm became as strong as ever, and the patient, up to the present time, 11 years after the operation, has had no further trouble.

An unsuspected fracture without displacement

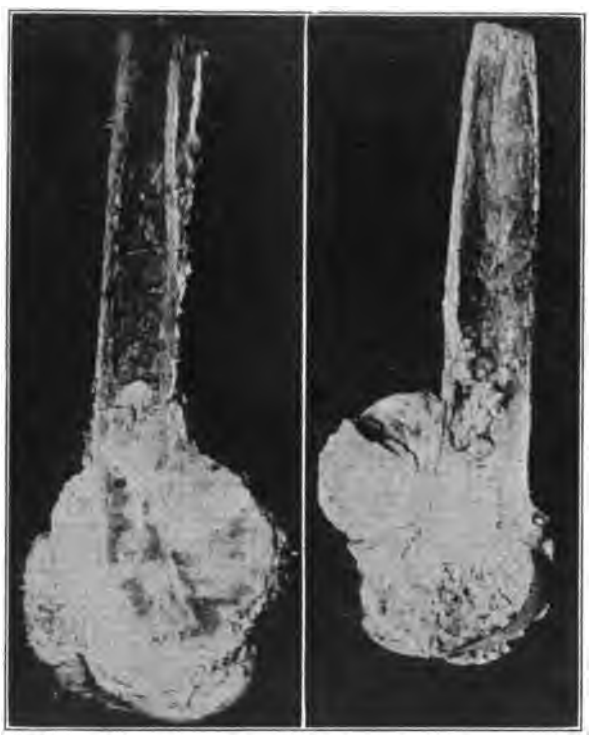


Fig. 10. Section of periosteal osteo-sarcoma of at least eleven months' duration. From a woman aged 62.—Royal Free Hosp. Mus.

Fig. 11. The opposite half of the preceding specimen after maceration.—Royal Free Hosp. Mus.

may readily simulate carcinoma. This skiagram shown is of the tibia of a schoolboy who was sent to me two or three years ago for a second opinion, a probable diagnosis of sarcoma having been made on the strength of a radiogram of rather poor quality, of which I could make little or nothing. Exploratory incision, with a view to an operation, had been proposed to the parents before I saw the boy.

There was a distinct swelling in the upper third of the tibia, and the history was that some four months previously he had been struck on the leg by a cricket ball; he had never been laid up, but had continued to attend school and to walk about, although with pain and difficulty. A swelling had appeared recently. The case did not seem to me to be sufficiently characteristic to justify exploration without more evidence, so I sent him to Mr. Archibald Reid, who took the skiagram before you. It shows clearly that there has been a transverse fracture of the upper part of the tibia without displacement. No operation was done, and the boy soon got quite well.

Once when visiting one of the London infirmaries, the superintendent showed me what he said



Fig. 12. Radiogram of fibro cystic disease of the radius.—Kindly lent by Mr. S. Gilbert Scott.

was an interesting case of slowly growing sarcoma of the tibia. There was a lump as big as an orange surrounding the middle of the shaft of the tibia. It was very hard and irregular. But on carefully investigating, I found that the two halves of the tibia could be made to move upon each other. It was a case of old, ununited transverse fracture of the tibia, with a large deposit of callus round the broken ends.

Sarcomata in the middle of the shaft of long

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bones are most likely to be mistaken for periostitis or necrosis. The form of necrosis which is most likely to lead to an erroneous diagnosis is that known as central necrosis. A small piece of necrosed bone causes the formation of a large, often spindle shaped mass of inflammatory new bone, without any evidence of suppuration. (Figs. 8 and 9.) In some cases the occurrence of spontaneous fracture increases the resemblance to sarcoma.

Sarcomata at the ends of long bones are most likely to be mistaken for disease of the neighboring joint or for epiphysitis.

The diagnosis between tumors of the ends of long bones and inflammatory disease of the neighboring joint is admittedly difficult. It is a striking fact that a large number of sarcomata of the ends of long bones are treated often for considerable periods of time as cases of inflammation of the neighboring joint.

Butlin and Colby, for instance, in their excellent, but comparatively little known, paper on the results of the treatment of sarcomata of the long bones,[1] state that out of *22* cases of sarcoma of the femur treated at St. Bartholomew's, no less than 10 had previously been treated for chronic or subacute synovitis.

Let me give you a few illustrative cases that I have seen.

Sarcoma Simulating Disease of the Knee-joint.—Mrs. B., aged 62, was first seen by myself on September 8, 1889, at Bagshot, for supposed disease of the knee-joint. Eleven months previously she had first noticed pain in the left knee, followed soon afterwards by some swelling. The pain was of a dull rheumatic character, never very severe, but never absent. The swelling gradually increased. For three months she had been confined to bed, and had been treated by a back splint and strapping by the three doctors under whose care she had been. There had been occasional attacks of slight synovitis.

The patient was a perfectly healthy looking woman; there was no history of injury. The whole knee was swollen, the swelling being most marked above and on both sides of the patella. The movements of the knee were a good deal restricted, but quite painless.

The case at first sight looked very like chronic tuberculous disease of the joint, but the key to the diagnosis was found in the popliteal space which

[1] St. Bartholomew's Hospital Reports, Vol. xxxi. 1895.

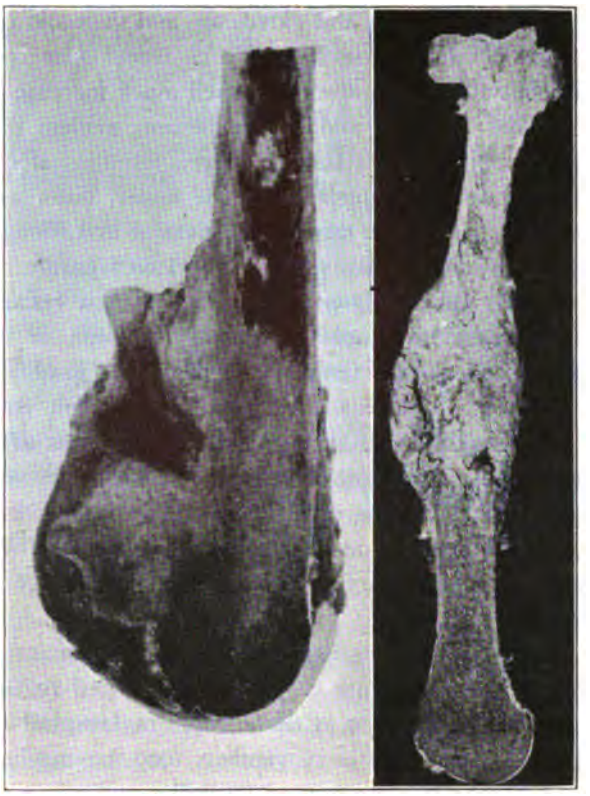


Fig. 13. Periosteal sarcoma of the femur. Treated at first by Coley's fluid, then by amputation. Patient still well, more than two years after operation.—Royal Free Hosp. Mus.

Fig. 14. Periosteal sarcoma of humerus, with spontaneous fracture.—Royal Free Hosp. Mus.

was nearly filled with a dense, hard, nodular mass firmly fixed to the back of the femur. The case was clearly one of sarcoma, and a few days later I amputated through the middle of the femur. She made a rapid recovery, and for more than a year she was able to get about and enjoy life.

In November, 1890, I heard that she had developed a cough, and had signs of a growth in the chest, and of this she eventually died. No recurrence took place in the stump.

The tumor, which is now in the Royal Free Hospital Museum, was a periosteal osteo-sarcoma. (See Figs. 10, 11.)

Sarcoma Simulating Disease of the Hip-joint.—A young man, aged 18, came under my observation at St. Bartholomew's Hospital, in 1897, where he was under the care of Sir Thomas Smith, with what was at first supposed to be tuberculous disease of the hip of three weeks' duration. He had pain in the hip and knee; the hip was stiff, painful and tender, and there was some ill-defined swelling about it; the thigh was flexed and abducted and the

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muscles wasted; the temperature was normal. He was treated by rest and extension, and then allowed to get about on crutches. Three weeks after admission a fall upon the hip caused much increase of pain and swelling, and it soon became evident that the femur was fractured. Three months later a distinct swelling appeared at the upper, outer and anterior part of the thigh. This was at first thought to be an abscess, but puncture on two separate occasions yielded only a little blood. It now became evident that the case was one of sarcoma of the upper end of the femur. The swelling gradually increased; there was much pain; the patient emaciated steadily, and finally died, eight months after admission. The post-mortem showed a large, very soft sarcoma of the upper third of the femur, with secondary growths in the chest and abdomen. There was some secondary ulceration of the cartilage of the hip-joint.

Sarcoma of Trochanter Simulating Disease of the Hip-joint.—Edith G., a schoolgirl, aged 12, first came under my care at the Alexandra Hospital for Hip Disease, early in November, 1907, having been sent up by Dr. Berridge, of Redhill.

The previous history was as follows: Towards the end of December, 1906, that is nearly one year before I first saw her, she had complained of pain in the left hip; the pain was of a dull aching character, worse when walking about, and especially bad at night; there was some impairment of movement of the hip. She was at that time under the care of Dr. P., of S—, who, naturally suspecting disease of the hip-joint, advised rest.

This was carried out for a month. The patient was then apparently so much better that she was allowed to return to school. She subsequently had a recurrence of pain, and saw another doctor, who thought she had "rheumatism." Later she began to complain of pain also in the knee. In October, 1907, it was noticed by the lay authorities of the school which she attended that the child was limping and in pain, and she was seen by Dr. Berridge, of Redhill, who found that she had an evening temperature of 102°, and sent her up to the Alexandra Hospital for diagnosis and treatment.

Here on November 8th, when I first saw her, the left thigh was found to be in a position of slight abduction, with wasting of the muscles of the thigh and considerable limitation of the movements of the hip.

The circumferential measurement of the affected hip was some three inches greater than that of the opposite side. Occupying the upper and outer part of the thigh in the region of the great trochanter was a deep-seated, somewhat elastic, painless swelling, about as large as a moderate sized apple. The freedom with which the hip-joint itself could be rotated, although within restricted limits, together with the position of the swelling which was in the region of the great trochanter rather than of the hip-joint itself, made it obvious that the case was not one of tuberculous disease of the joint itself. A probable diagnosis of sarcoma of the upper end of the femur was made both by myself and by my colleague, Sir Anthony Bowlby, who also saw the case. The child was immediately transferred to the Royal Free Hospital, as the case was not suitable for treatment at the Alexandra Hospital.

The parents were not willing that any operation should be performed, and took the child home. Here she came under the care of Drs. U. and P., of S—, who were not unnaturally unwilling to believe that the diagnosis of so rare a disease as sarcoma of the trochanter could be correct, and believing the soft swelling to be an abscess, admitted the child to another hospital, and punctured the tumor. Through the trocar some soft, jelly-like material was obtained, which was found microscopically to be sarcoma.

No further operation was performed. The tumor grew steadily, and I was informed that the child died about six months later.[2]

A case of a somewhat different nature, in which inflammatory disease of the bone and not of the joint, was simulated by a sarcoma, is the following:

In 1895, a young man of 18 came under my observation at St. Bartholomew's Hospital, on account of a small, soft, elastic swelling just above the inner side of the knee. For about a month he had complained of pains in that region, and for three weeks he had been aware of the existence of the swelling. It was at first thought to be an abscess, but an incision made into it yielded only some clear fluid. A more extensive incision showed the growth to be a periosteal sarcoma as large as a goose's egg.

[2] Since this address was delivered, Mr. Angus has been good enough to show me in his wards at the Newcastle Infirmary, a young man with an enormous and quite inoperable sarcoma of the upper end of the hip. In this case, too, as in those that I have narrated above, the diagnosis made by those who saw the case in its earlier stages seems to have been tuberculous disease of the hip-joint.

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Amputation through the thigh was followed by a good recovery.

The lesson that these cases should teach us is that sarcoma in the neighborhood of a joint may very easily simulate tuberculous disease of that joint. Even the softer portion of the tumor itself may closely resemble a painless tuberculous abscess. It is in the early stages of the disease that the possibility of malignancy should be present in our minds. A good skiagram will often clear up the diagnosis. It should be borne in mind, however, that unless the skiagram is a really good one, it may be most misleading, and the interpretation even of a good skiagram is not always easy.

Cysts and fibro-cystic disease of bone, of which, by the kindness of Mr. Gilbert Scott, I am able to show you an excellent skiagram (Fig. 12), are especially liable to be mistaken for malignant tumors even after x-ray pictures have been taken.

The prognosis of treatment of *periosteal* sarcoma by amputation or excision is about as bad as it can be.

Whatever method of treatment be adopted, it is very rare for a patient with this terrible disease to survive the operation as long as two years.

Occasionally, however, very exceptional and striking cases do occur which hold out some slight encouragement, and it is possible that if only we could see the cases really early, we might do more for the cure of these patients than we do.

But the patients die of metastases, not of local recurrence, and until we can find some way of checking metastasis, whether by x-rays or radium or otherwise, we shall never do much for them by amputation.

Of most *endosteal* tumors the treatment is of course much more satisfactory. When seen really early they can usually be cured definitely either by excision, erasion or amputation. I could point to many such cases, did time allow. The most interesting question that has come of late to the fore is how far one is justified in doing local resections for the larger myeloid tumors, the place of the resected bone being taken by vulcanite or steel rods, by living bone or even from the cadaver.

With regard to Coley's fluid, I have never myself seen a case that was definitely cured by it, but I think I have seen benefit from its use. I have here a specimen of a periosteal sarcoma of the lower end of the femur, from a young woman under my care at the Royal Free Hospital, who at first refused an amputation. I treated her with Coley's fluid for some weeks with no apparent benefit, and she then allowed me to amputate at the junction of the upper and middle thirds of the femur.

When I last heard of her, more than two years after the operation, she was still alive and well, and able to do her work as a servant. I think that the growth shows some evidence of retrogressive changes, and am inclined to attribute them to the use of the fluid. (Fig. 13.)

Having enjoyed many long talks with Dr. Coley himself, and last year with several leading American surgeons who have sent him cases, I am inclined to think that it does sometimes do good.

Of the use of radium in the treatment of sarcomata of bone, it is best at present to say nothing beyond that it appears to promise to be useful, although it can scarcely be asserted that anything very definite has yet been *proved* with regard to its efficacy.

Recurrence after amputation for periosteal sarcoma of a long bone nearly always takes place in distant organs in less than two years, and often much sooner.

Nevertheless it does occasionally happen that recurrence is delayed much longer, or does not occur at all.

Two very exceptional cases have come under my observation which deserve a brief notice, if only for their rarity.

In June, 1884, a schoolboy, aged 12 years, was admitted into St. Bartholomew's Hospital, under the care of Sir Thomas Smith, for a sarcoma of the upper end of the right humerus. It had been first noticed 18 days previously, and was as large as an orange. It was considered to be a very unsatisfactory case for operation, on account of the softness of the tumor and the apparent rapidity of its growth. Amputation at the shoulder, was, however, performed, and the boy left the hospital a month later. The tumor, which was examined by Sir Anthony Bowlby (at that time surgical registrar), was a mixed celled periosteal sarcoma, springing from the shaft of the humerus immediately below the epiphysial cartilage. I did not see this patient again until six years later, when he was shown to me by the

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doctor under whose care he then was (Dr. Lovell Drage, of Hatfield), and I learned to my surprise that the boy was still alive and apparently quite well. But in the following year any possible doubt that might exist in the mind of a skeptic as to the correctness of the original diagnosis (although none was really possible to those who had seen the operation) was set at rest by the fact that the patient died in the London Temperance Hospital of secondary sarcoma of the lungs. The lungs were kindly shown to me by the surgical registrar, who knew that I was interested in the case. Both were studded with numerous masses of sarcoma.

A still more remarkable case of long immunity after removal of an undoubted sarcoma of a long bone, is one of which I witnessed the operation at a still earlier date, and the patient is, I am glad to say, still alive and well at the present time, no less than 33 years afterwards.

May W., aged 26, was admitted to St. Bartholomew's Hospital, in July, 1881, for a tumor of the radius, which was excised by Sir Thomas Smith, together with the upper four inches of the radius. It was examined microscopically and pronounced to be a periosteal sarcoma. In the following October the patient was re-admitted with recurrence at the seat of operation, and on November 2, 1881, amputation was performed through the upper arm. Six years later I saw her, and found she was still well.[3]

I then lost sight of her. But quite recently, in August of this year, my friend, Mr. H. Blakeway, after much trouble (for she had changed both her name and her address) succeeded in finding her, and reports to me that she is still quite well.[4]

Gloomy as is the prognosis in most cases of periosteal sarcoma, yet cases such as these, rare as they are, do encourage us a little to believe that if only we could see periosteal sarcomata at a really early stage before any metastasis has begun, something might be done for the cure of the patients by early and free destruction of the primary growth by one means or another. But unless the tumor can be discovered by x-rays or otherwise, while it is really quite in its infancy, operative treatment does not hold out much hope of cure.

[3] Her case up to this point is recorded by Sir Henry Butlin, in his "Operative Surgery of Malignant Disease," as a remarkable one.

[4] Since the above address was delivered, I have myself seen and examined the patient.

WHERE DO GALLSTONES FORM?*

By H. S. LOTT, M.D., Winston, N. C.

The life history of the elusive and migratory gallstone is of much practical interest from two distinctive points of view: First, we do not know just where in the biliary tract the cycle of formation has its starting point; and, second, we do not know just when and where it will stop. That this formation is caused by the precipitation of salts in excess in a fluid medium of bile, we know to be a fact, and that alterations in this normal and vital fluid, favoring such precipitation, may be of either infective or traumatic origin, we have also learned to be true; but just where to direct our attack, that we may relieve the patient of this irritative and fatal pathology, is still in the shadow-land of doubt.

The gallbladder, holding normally about an ounce of fluid bile, was long deemed both the "stone quarry" and the site of the formative process, but the clinical history of undoubted cases—subsequent to operation—has fully dispelled this delusion, and has also fully established both the elusive and the migratory character of the stones.

Free stones, wherever located and while quiescent, give comparatively mild, though pretty constant symptoms of "indigestion," and unfortunately it is only when the stone begins to travel and attempts to enter the lumen of an outlet smaller than itself that the crises of pain awaken the conscience to the activity of making a correct diagnosis.

"Indigestion" is the cloak for both indifference and ignorance, and I firmly believe that if much of the text-book teaching about it could be compiled into manuscript saturated with essence of pepsin and burned, many valuable lives would be saved.

Accepting the theory as true that stasis of bile favors the formation of calculi, we must also acknowledge that while the gallbladder is the most likely one, it is not the only place where such stasis may occur, and we must also concede that stones, becoming migratory either from an over-crowded quarry or other local conditions at their point of origin, may travel from the various ducts throughout the hepatic structure and find their way into the gallbladder; or reversing the current, stones forced from this reservoir and through its cystic duct, and

* Presented at semi-annual meeting of Eighth District Medical Society, Winston-Salem, N. C., December 1, 1914.

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missing the common duct outlet, may again pass into the larger hepatic ducts and there become impacted.

It just happens that a few cases have come under my observation, each presenting a different phase of gallstone pathology, and two of them also emphasizing the fatal ravages of the stones.

These patients were all females, somewhat past the middle period of life, and in those submitting to operation the stones were reached through an ample right rectus incision.

The stones I am showing you, from Case I, were passed in the stools after a severe attack of pain. This patient had been subject to gallstone colic, followed by more or less jaundice, for more than twenty years, with constant "indigestion." Finally, when prostrated and in utter desperation, she consented to an operation, which proved to be only an exploratory one, as the liver was found to be but a hardened malignant mass extending far below the border of the ribs, surely forecasting the fatal result which very soon followed. In this case can we doubt that her gallstones—a constant local irritant—perhaps incited, and most surely stimulated, the malignancy?

In Case 2 the single calculus was located about midway in the common duct, and was removed through a free incision in the latter. This patient came to me almost in extremis after sixteen years' of violent recurrent attacks of pain and constant and distressing indigestion. The gallbladder was free from stones and of normal size and content, while palpation of all ducts throughout the entire region revealed no other stones. A rubber tube was passed into the proximal end of the common duct, brought out at the lower angle of the abdominal incision, and fixed with a catgut stitch, closing the incision to this point. A copious flow of bile marked the first week after operation. This gradually became less, until soon after removal of the tube spontaneous closure occurred, and the subsequent history of the case, which is more than three years old, indicates that the patient is well. The single large stone and the question of its starting point represent the unique features of this case.

Case 3 was a very active, energetic woman, and her chief complaint upon being sent to me was of a "tumor" in the right lower abdomen, which gave a great deal of trouble and discomfort from sagging and changing its position. Upon examination when standing, the tumor could be easily palpated through the abdominal wall, and its shape—that of an immense pear—easily outlined. Through a free right rectus incision the mass was promptly located and delivered, proving to be a gallbladder very large and tense, with the largest of these calculi impacted in the cystic duct. The specimen was removed intact, and the stones, with about six ounces of heavy mucus and bile, found to be the content. That the gallbladder had performed no function for a long time is beyond a doubt, and its removal, along with its inhabitants, has proven a great comfort to the patient. No other stones were found, and the subsequent history of the case has been satisfactory. These stones must have formed in the gallbladder, and with the permanent closure of the cystic duct the process must have stopped.

In Case 4, of which I have a vivid mental picture, the patient had violent attacks of pain almost throughout a lifetime. Ten years ago, during a paroxysm, the gallbladder could be distinctly outlined, being of the size of a large pear and projecting below the ribs. Operation at that time would not have been considered.

Two years ago, when operation was finally accepted, the gallbladder was found completely atrophied and firmly fixed to the surface of the liver. Within its shrunken walls were a few small stones, while the cystic duct was completely closed with a larger one. These were all removed, and although the cystic duct was no longer patulous, drainage was established from the cavity of the gallbladder through the lower angle of the incision. Before closing, each duct—so far as the hand could reach—was palpated, and a few small stones milked out into the common duct. The convalescence was uninterrupted, and for nine months the patient "enjoyed life" more than for many years. Then came a violent attack of pain, so violent and so prostrating that, had the proposal of a second operation been accepted, the question of enough vitality for its performance would have been a very hard one to decide. After many hours of pain, and also after its sudden subsidence, two very large "mossy-backed" stones were found in the washings of an enema. From their point of perforation—for they had perforated the gut—emanated a pyemia, giving localized pus foci in several of the joints, and the scene was closed with a rapid and general peritonitis. Were the stones driven from the gallbladder

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years ago, and failing to enter the common duct of outlet, secreted in some other hiding place?

Deductions from this group of cases lead me firmly to believe:

First, that we do not know just where the gallstones form.

Second, that they occur more often in women than in men.

Third, that they are a constant, violent irritant to the regions of their origin and invasion.

Fourth, and most important of all, that in early recognition and early removal of the stones, together with the possible source of their origin, if it can be located, lies the greatest safety for the future of the patient.

EXOPHTHALMIC GOITER.—REPORT OF A CASE.*

By H. HORACE GRANT, A.M., M.D., Louisville, Ky.

The specimen herewith exhibited was removed about two months ago, and has a rather interesting history. The patient presented a condition on which there is no unanimity of opinion as to surgical treatment, viz., exophthalmic goiter, yet a prompt and satisfactory recovery followed the operation.

M. F., female, aged forty-seven years, had suffered with goiter for about three years. There had been noted but few of the early classical features, but during the last eight or ten months the goiter had continued to gradually enlarge and characteristic manifestations had become extremely annoying. The enlargement was most pronounced upon the left side, *i. e.*, practically confined to the left lobe. The condition was becoming progressively worse, the patient's pulse varied from 120 to 140, and within the last four months she had lost about forty pounds in weight. She had become exceedingly nervous, complained of serious difficulty in breathing, and exophthalmos was pronounced.

The patient had been under the constant care of a competent physician, but despite medical treatment had grown steadily worse. Her condition, however, still remained such that it was thought she could withstand immediate surgical intervention without much preliminary preparation. After about a week of rest in bed and the administration of digitalis, her pulse-rate declined to 80. However, when her position was suddenly changed, or she became the least excited, the pulse would rise to 110 or 112, but never reached the rapidity shown before the patient was placed upon preparatory treatment.

The operative measures were comparatively simple. Under gas-oxygen anesthesia, with preliminary morphin 1-4 grain and atropin 1-150 grain, and the novocaine infiltration according to the Crile method, the thyroid gland was exposed by a transverse incision and the left superior thyroid artery ligated. The muscles were pushed aside and the surrounding fascia divided to the capsule. The enlarged gland was then readily "peeled out" with the finger, that is, instead of the dissection being made with the knife, it was really completed by the fingers, the adhesions being slight. Only the left lobe was removed. The right lobe was uninvolved and did not appear in the wound. The capsule of the left lobe was undisturbed, and no injury was inflicted upon the laryngeal nerve, an accident which sometimes occurs in attempting ligation of the inferior thyroid artery and removal of the capsule.

The secret in the successful execution of the operation consists in enucleating the gland without disturbing the capsule. The parathyroid glands are located beneath the capsule, the inferior thyroid artery penetrates it at its lower portion, and the laryngeal nerve, which is completely posterior to these structures, need not be disturbed if the gland is simply "peeled out" of the capsule. However, any attempt to remove the capsule or even any careless dissection is likely to cause injury to the nerve.

One of the most interesting features in connection with the operation was that the patient had but slight shock. The pulse was rapid for two or three days after its performance, but she made an excellent recovery, has gained in weight, and is now in better physical health than she has been for many years. The cardiac symptoms and the exophthalmos have entirely disappeared and the remaining scar can scarcely be detected. Such favorable results by no means necessarily follow the operation, especially where the manifestations have become so pronounced as in this case; and complete recovery was much more rapid than ordinarily after procedures of this character.

The diagnosis in this case was apparent at a glance, no difficulty was encountered in the operative steps, and the result is in every way highly

* Clinical report before the West End Medical Society, of Louisville, Kentucky.

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satisfactory. While it has no bearing upon the question of goiter, it may be interesting to note that both the ovaries and tubes of this patient were removed several years ago for bilateral tubo-ovarian disease following parturition.

The preparatory treatment before operation upon individuals suffering from hyperthyroidism of course depends upon the severity of the disease when the cases are first observed. In many instances, where in the beginning there is a simple goiter, the patient sooner or later develops grave cardiac and nervous manifestations. However, the exact pathology of hyperthyroidism remains undetermined. There are different varieties, *e. g.*, in some cases there is no exophthalmos and in others no definite cardiac disturbance. The increase or decrease of iodine in the system is presumed by certain authorities to have some influence upon the character of the pathology exhibited.

To prevent the later development of grave manifestations, the removal of the persistently enlarging thyroid gland is conceded to be a wise plan, even when there are no attending nervous symptoms. If the patient is older than thirty years, if the goiter is increasing in size and its presence causes discomfort, even in the absence of the characteristic manifestations of hyperthyroidism, removal of the enlarged gland is distinctly advisable. The operation is not difficult, and has practically no mortality provided the patient is in good physical condition. It may be successfully and satisfactorily performed under local anesthesia in skilled hands, and later disastrous results may be thereby avoided. Unquestionably when the disease has become established, the shortest route to its cure is by surgical intervention. Medical treatment to be effective must be long continued, and while the life of the patient may not be in immediate danger, in the great majority of instances the disease gradually progresses. The earlier surgical treatment can be instituted, *i. e.*, before the general health of the patient becomes impaired, while the pulse can be easily controlled, before grave nervous manifestations and changes in the heart muscle supervene, the better the prospects of ultimate cure.

If the patient is in a serious condition when first observed, it may be inadvisable to undertake complete extirpation of the goiter, and one of the simpler methods of treatment may be employed. One of these is ligation of one or both superior thyroid arteries; another is the injection of boiling water into the substance of the gland with the view of causing its shrinkage. The latter method was employed in one of my cases and was followed by marked improvement. Although the patient still exhibits some of the symptoms of hyperthyroidism, she has improved to such extent that she declines to submit to radical operation. In this instance one of the superior thyroid arteries was first ligated, but as improvement was slight following this procedure, three or four injections of boiling water were made. Improvement was rapid thereafter and has continued. However, all such minor operative steps are merely preliminary, and it is better to remove the enlarged gland. If both lobes are involved, the complete enucleation of one may be advisable before undertaking operation upon the other, and when only one lobe is involved the entire lobe need not be extirpated.

In the case reported the right lobe was apparently uninvolved; it did not appear in the wound and was not disturbed. It is always the proper step to leave a portion of the thyroid gland in the hope of preventing the later manifestations of struma, myxedema, etc., which are very likely to follow its complete extirpation. It is believed, however, that where the enlargement is gradually progressing, if surgical treatment can be applied while the patient is in the most favorable condition to withstand the operation, it is better to take advantage of the ounce of surgical prevention than trust to prolonged medical treatment or the hope of spontaneous cure. Of course this statement does not apply to the goiter frequently observed in girls about entering the period of puberty. The slight enlargement of the thyroid gland seen in school girls seems to be physiological rather than pathological, and usually disappears without treatment.

The foundation of the principle of conservatism as applied to the pelvic organs, is the fact that the functions of ovulation, menstruation and the power of conception are valuable, in many women a necessary influence to the production of good health, particularly of mental health and happiness, and its object therefore is the preservation of these functions to the extent of procuring what may be designated as good health.—Dr. H. B. Beyea (*Pa. Med. Jour.*).

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RUPTURE OF THE GALLBLADDER.*

By GEORGE A. HENDON, M.D., Louisville, Ky.

A woman of fifty, the mother of two grown children, had numerous attacks of gallstone colic extending over two years. I saw her in several of these seizures, but she steadfastly refused to consider operative treatment.

Early in November, 1912, about five o'clock one morning, she had a most severe attack. Pain was intense, there was profound shock, and soon thereafter symptoms of peritonitis became conspicuous. The abdomen was greatly distended, vomiting supervened, and the pulse rose to 160 per minute. The focus of the trouble was defined by a mass in the right side of the abdomen. For two days there was a gradual amelioration in severity of the symptoms, and in four weeks the patient was convalescent. The mass in the right side was still plainly discernible, and the temperature ranged from 99¼ degrees to 110 degrees F. The patient slowly gained strength and her appetite improved, but elevation of temperature continued. During the third or fourth week of the illness she evacuated a large quantity of pus and decomposed blood from the bowel.

Operation, February 28, 1913. Incision as for opening the gallbladder was made, and through the opening search was instituted for this viscus. There was first encountered a wall of omental plications attached to the parietes along the right side as far downward as the upper border of the ilium. The adhesions were separated and search extended beneath until remnants of the gallbladder were disclosed. It presented the appearance of a "wrecked toy balloon." The walls were thick and curled inward. I did not attempt to discover the communication with the intestine, but presumably one existed, or at least did exist prior to the operation. Considerable hemorrhage followed the exploration. Two drains were carried to the bottom of the cavity, and the abdomen closed.

The discharge of thin offensive pus began the day following the operation, and the third day expectoration of pus commenced which persisted one day and night. Examination of the discharges showed almost pure cultures of colon bacilli.

There have developed since the operation no unfavorable symptoms. The temperature has ranged between 99 degrees and 100 degrees F., the patient is gradually gaining strength, and is now ready to leave the hospital.

My interpretation of the case is that there occurred a rupture of the gallbladder, probably due to calculi which passed into the intestine from ulceration and perforation resulting in the discharge of pus and decomposed blood. The expectoration of pus may be explained by the fact that some of the material found its way through the diaphragm due to ulceration followed by perforation.

The discharge from the drainage tract was profuse, and the odor was terrific during the entire period of drainage. No fecal matter, however, appeared through the drainage tract. Even now the patient has occasional paroxysms of coughing, during which she expectorates a foul smelling sputum. This has been repeatedly examined and cultures of colon bacilli are always disclosed.

In discussing the foregoing report Dr. A. M. Vance recalled five cases of rupture of the gallbladder, but in none of them was there expectoration of pus. In one case no calculi were found. One woman was operated upon for an enormous umbilical hernia; a large mass of the omentum was gangrenous, and a great quantity of the intestine came out of the wound. Exploration disclosed rupture of the gallbladder which had evidently taken place during the excessive vomiting caused by this tremendous hernia. Two of the patients were pregnant women; the gallbladder was found ruptured, and there escaped a large quantity of grumous material along with a number of calculi. In one of the pregnant women pus reached the liver. In a man with rupture of the gallbladder the liver was also perforated, there was necrosis of several ribs, and a collection of gallstones was found just underneath the skin. Nature had endeavored to eliminate them after necrosis of the ribs had supervened. This man was the only one of the five patients that died, and he succumbed to Bright's disease about a year afterward, the sinus never closing.

Dr. H. H. Grant, four or five years ago, saw a case similar to the one reported. The patient was a fleshy woman who had a very large abdomen, and a mass occupied the space between Poupart's ligament and the gallbladder region. There were two fistulous openings from each of which were removed several gallstones. These fistulæ were split

* Clinical report before the Louisville Surgical Society, March 21, 1913.

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for some distance through the hardened tissue, and drainage was practiced, but the gallbladder was not exposed. The fistulæ did not extend into the peritoneal cavity, and the openings were merely enlarged sufficiently to afford adequate drainage. The patient made a satisfactory recovery, and had no subsequent trouble. There must have been rupture of the gallbladder which was protected by adhesions so that the peritoneal cavity was isolated, and the calculi escaped through the sinuses. Before he saw the patient two calculi had been discharged, and later several others appeared through the fistulæ, which kept open the communication for a considerable time after occurrence of the suppurative process that induced the formation of the fistulous tracts. He recalled one other case of rupture of the gallbladder, where a calculus was found imbedded in the liver. There had been a severe attack of peritonitis before the patient came under his observation. The omentum had "capped over" the inflamed portion of the cavity, and the calculus under the liver surface was also covered by omentum. When the omentum was separated an abscess cavity was revealed from which the calculus was removed. The patient made a satisfactory recovery. He thought Dr. Hendon was wise in not endeavoring to remove the gallbladder remnants. Had he done so most likely the patient would have perished. His method of simple drainage under the circumstances was the kind of conservative surgery that the speaker was inclined to recommend.

In closing Dr. Hendon called attention to one striking feature in the case reported, *i. e.*, that three or four days after the operation the patient expectorated a considerable quantity of purulent material, and exaggeration of her sitting posture caused immediate cessation of the coughing paroxysm, the pus evidently gravitating in the opposite direction. It was the most notable example he had ever witnessed of the influence of gravity over intra-peritoneal accumulations of pus.

In spite of the fact that we know much about the anatomy and the physiology of the pancreas, the cause of the sudden overwhelming attacks of acute pancreatitis remains as much a mystery as ever, and although the operation may reveal extensive hemorrhage and wide destruction in the organ, the causal factor still remains to be explained.—Dr. Lucius W. Hotchkiss (*Provid. Med. Jour.*).

REFLEXES.

By C. S. Eldridge, M.D., Chicago, Ill.

Etiological factors that are obscured to the view of the average physician and surgeon exist to distress and torment the human family. If we are to put an extinguisher upon reflex symptoms, it is absolutely necessary to locate and attack the lesions responsible for them. The application of certain laws in the various departments of scientific procedure will invariably produce foretold results. All mathematicians know that twice two make four; by common consent the clock is looked to for correct passing hours of the day or night; we are satisfied that a time-piece, if in normal condition, can be depended upon to give us the seconds, minutes and hours correctly, but when the gearing becomes interfered with, it does not keep correct time and we send it to the repairer.

When out of condition, however, we do not as promptly go to the physician or surgeon for an adjustment of disturbed functions. Duty and sympathy move us when a horse, dog, or cat becomes ill, and I see no reason why we should be more deeply interested in these animals than in ourselves. To my mind, a regard for human health should surpass all earthly considerations. No one can have a maximum of happiness, or carry on business to the utmost conserving of its interests, if health is to any considerable degree impaired.

The class of cases to which I especially desire to refer are those of a chronic nature; those that linger and put upon the human face pallor and lines born of irritation. The study of chronic disturbances has become to me a pleasure; conditions that as a tyro I dreaded to encounter, I now with fervor attack and easily cure. When I have determined their etiology I more confidently assail them. If we can definitely locate the cause of a derangement of the body we certainly are better equipped to combat it than we would be if doubtful. I do not like to use a shot-gun in the dark, trying to vanquish a foe. Many are striving to obtain a livelihood who drag themselves through the channels of labor, mental and muscular, when shorn of needed systemic balance. I think of mature women and girls, thousands upon thousands of them, toiling for self-support, all handicapped by an exhausting nerve waste. I feel much interested in this class of cases. These unfortunates are fighting an unseen enemy,

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and in the battle are combating effects instead of causes. Can such efforts accomplish cures? Many troubles exist that during development induce little if any pain, but having gained lodgment commence a protean expansion. At first one function may become demoralized, then others become involved, until a community of organs is working discordantly. Cephalalgia, indigestion, languor, insomnia, loss of appetite, chronic constipation, and recurring attacks of diarrhea, all have, of course, a predisposing and exciting cause, and to attack the various symptomatic phases of this kind without divining their etiology means scoring a failure in treating them. To be successful in the future we must substitute a therapy based upon knowing what is the matter for that now so prevalent, viz., treating effects instead of causes. To cure our patients in the shortest possible time will insure the enlargement of our clientele and permit us to earn more deserved glory and professional renown.

Most lesions responsible for reflex symptoms are located remote from regions where they are manifest; afar from where patients think them located. Far too many ill people who consult the physician play the leading card, and the doctor follows suit. To the medical philosopher who understands reflexes, who is awake to the dire effects produced by hidden lesions, the task of cornering them is usually easy, and can generally be accomplished. Though at first seeming of a recondite character, they really are not, and the riddle can be solved by *a priori* reasoning. Experience and observation have taught me that the complaints of most people are but shadows of the real difficulty; to state it more plainly, a duodenal ulcer punishes the stomach; gallstones upset the gastric functions to a remarkable degree, and chronic appendicitis (the worst enemy of the race) unmercifully disturbs not only stomach digestion, but intestinal as well.

Nerve waste is responsible for poor capillary circulation, which may mean congestion in one zone and decided lack of blood supply in another. Capillary circulation without organic balance to properly control it means sooner or later a marked disturbance of functions and is especially prone to derange digestion, assimilation, and metabolism. Bones depend upon normal capillary circulation for nurture, as do muscles and all structures of the economy requiring nutriment. The organs and functions controlled by the cerebrospinal nervous system are to a considerable extent under the dominance of the will; we can resolve to clench the hand and promptly do so; we can request the kidneys to cease secreting urine, but as they are under the dominance of the great sympathetic they give no heed to the request. The sympathetic does not speak in the language of pain, but with a nudge requests its neighbor controlled by the cerebrospinal nervous system to make its plaint and outcry for relief. Nerve waste does not exist without a specific cause to produce it, and it is the wise physician or surgeon, when confronted by such a case, who diligently seeks to find the cause, making no real effort to effect a cure until it is detected.

It no longer admits of doubt that lesions situated just within the various outlets of the body may produce a most distressing array of symptoms. I find the hemorrhoidal inch a place where they can often be found. Erosions of the mucous membrane lying between the rectal sphincters exist and are responsible for symptoms appearing in higher zones of the body; these lesions cause cold hands and feet complained of in July and August, and why? Because they induce sphincter contraction that garrotes terminal nerve fibers which will power cannot abate. A five or ten per cent. solution of nitrate of silver applied to the eroded surface two or three times will usually cure the trouble. Internal hemorrhoids cause contraction of both sphincters which results in the pinching of nerve fibers. I remove the hemorrhoids in such cases and cure the distresses for which they are responsible. A chronic proctitis, until it is cured by local applications, without interruption sends upward the most discomforting sensations with which the patient has to contend, and they disappear when the proctitis is cured. If a person be asked to hold a heavy bag of bird shot at arm's length for any considerable period of time there would soon be rebellion on the part of the supporter of the bag and an ardent desire to drop it. Ceaseless exertion will not do, all organs and tissues must have rest, but erosions in the hemorrhoidal inch or in the ampulla of the rectum produce ceaseless spasm of two endless muscles, viz., the internal and external rectal sphincters; to not give them periods of needed rest means exhaustion and demoralization of correlated structures. Put a clothes pin upon the string of a harp and its melody producing capacity is impaired. No more delicate is the harp-string than a human nerve filament.

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Few people can be found with absolutely sound teeth, yet I find more who have rectal irritation, urethral irritation and, in unmarried women, stenosis of the uterine cervix than I do with materially diseased teeth. Many times have I relieved a nervous wreck of a woman by removing a dense plug inducing a constriction of the internal os uteri. To succeed we must divine causes.

IMPORTANT ANNOUNCEMENT.

Realizing that the general practitioner is particularly interested in those subjects coming within the scope of his routine work, it affords us much pleasure to announce the forthcoming publication of a series of articles on diseases of the nose, throat and ears by James J. King, A.B., M.D., Attending Laryngologist, Hospital for Ruptured and Crippled; Chief of Clinic, Gouverneur Hospital, Ear, Nose and Throat.

These articles will be thoroughly practical and up to date, describing those conditions which are most frequently encountered by the physician and the newest methods of treatment, both medical and surgical. We feel assured that the author's extensive experience will enable him to present much interesting information and many helpful therapeutic suggestions. Among the subjects to be discussed are: Adenoids, diseases of the tonsils, affections of the turbinates, diseases of the accessory sinuses, diseases of the larynx, laboratory aids in nose and throat work, acute and chronic suppurative otitis media and mastoiditis, chronic catarrhal otitis media, the relation of the nose and nasopharynx to the ear, the Eustachian tube, laboratory aids in otology, and resume of recent advances in laryngology and otology.

SOUTHERN SURGICAL AND GYNECOLOGICAL ASSOCIATION.

Twenty-seventh Annual Session, Dec. 16, 1914.

Authors' Abstracts of Papers.

CANCER OF THE PROSTATE.

By E. S. JUDD, M.D.,

Mayo Clinic, Rochester, Minn.

It is difficult to estimate the frequency of occurrence of cancer in the prostate from operative records, since the cancerous tumor in this gland is very often small and may not produce local symptoms; but it is generally reported that one case in five of prostatic enlargement causing obstruction in old men is due to cancer. In my series of 878 prostatectomies, there were 93 cancers. The youngest of these patients was fifty-one years, the oldest eighty-two. In addition to these, 84 cases were diagnosed cancer, but were not operated on because too far advanced.

In many cases the symptoms of early cancer of the prostate cannot be differentiated from adenomatous hypertrophy. Pain associated with cancer is usually more constant and more marked in the region of the prostate and is not necessarily associated with micturition. Frequency of urination is also a prominent symptom and usually one of the first to appear. Hematuria was noted in 21.9 per cent. of the cases and was a comparatively late symptom. The specific gravity was unusually low, in many instances ranging from 1002 to 1005.

Physical examination in these cases may reveal a small prostatic gland, or, if hypertrophy is associated with the cancer, the enlargement may be quite marked. If on palpation the surface of the prostate is rough with hard nodules, it is always suspicious of cancer, since in the benign cases the prostates are nearly always smooth. In some of the cases in the series the gland was soft on palpation, due to the fact that the adenomatous hypertrophy predominated and the cancer could not be felt. A characteristic cystoscopic picture is a small prostatic bar, unless adenomatous hypertrophy exists at the same time. Cystoscopic examination is of great aid in these cases, but should not be made in those evidently hopeless since the reaction following may be quite severe.

A study of the specimens removed at operation showed that in about 75 per cent. cancer was asso-

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ciated with hypertrophy, and in the remaining 25 per cent. occurred in prostates in which no evidence of hypertrophy could be found. The benignly hypertrophied gland in some of these instances is quite as readily enucleated as in the ordinary case, and unless the posterior segment is enlarged the malignant process may easily be overlooked. If the hypertrophied part is more firmly attached posteriorly or shells out with difficulty, there is always suspicion of cancer.

Radical operations for cancer of the prostate have gained favor slowly, not because it is impossible to remove the growth within a reasonable degree of mortality, but largely because it is impossible to do a thorough radical removal of the cancerous prostate and the adjoining part of the bladder without completely destroying the mechanism of urinary control. Patients who are incurable but fairly comfortable either with or without the catheter should not be operated on, though certain of those who have not used catheters should be advised to do so, since they may be made more comfortable by its use. In many cases the obstruction to urination is due to a benign hypertrophy. Removing the obstruction and also a part of the cancer will entirely relieve the patients for a time, and they will be more comfortable than with any other procedure.

End Results. Through correspondence and personal communication 82 of the 93 patients operated on have been traced. Of these—

8 have lived more than 3 years.
12 have lived more than 2 years.
13 have lived more than 1 year.
24 died within the first 6 months.
5 died, date unknown.

Patients still living after 6 months	3
Patients still living after 1 year	7
Patients still living after 2 years	4
Patients still living after 3 years	3
Patients still living after 4 years	2
Patients still living after 9 years	1

The patient who is living and free from symptoms nine years after the operation had a very small cancerous nodule removed. Many of the patients living at the present time are entirely free from symptoms. Three that were operated on within the year, yet more than six months ago, are well. In the cases of recurrence, hematuria was one of the first evidences of this. Difficulty of urination was also an early symptom and became rapidly marked in a number of cases, necessitating suprapubic cystotomy. Several patients lived more than three years without evidence of trouble, when there was a return of all of their symptoms.

A LARGE HAIR CAST OF THE STOMACH SUCCESSFULLY REMOVED BY GASTROTOMY. REPORT OF A CASE WITH SPECIAL REFERENCE TO THE PREOPERATIVE AND X-RAY DIAGNOSIS OF THIS CONDITION.

By RUDOLPH MATAS, M.D., New Orleans, La.

Dr. Matas exhibited a large hairball (trichobezoar) removed successfully at the Touro Infirmary in May, 1914, from the stomach of a young white woman, aged nineteen years, who, as a child, had acquired the hair-eating habit while suffering from uncinariasis.

On June 19, 1914, the patient had been discharged from the hospital completely recovered after operation.

The mass weighed two pounds, three-fourth ounce, or approximately 967 grams. It was shaped like an inverted gourd, and was molded to the contour of the stomach. In the dry state, it measured 18 inches, or 46 cm., in its longest diameter (along its convexity); 10¼ inches, or 26 cm., in its broadest circumference; 8¼ inches, or 20 cm., around its middle portion, and 8⅛ inches, or 17 cm., in its narrowest circumference. The widest part filled the fundus of the stomach, and the narrowest the pylorus and duodenum.

It consisted of a mass of matted black hair, which, when dry, was felted and gave the appearance of the hair of a wild animal. Mixed with the hair were particles of earth and vegetable food stuffs, which had gravitated to the center of the mass and were in the tangle with mucoid and other organic matter. The mass not only filled the stomach in its entirety, but was gripped tightly by its walls in many places. An incision, 6½ inches along the anterior surface of the organ, was required to permit its extraction. When removed from the stomach, it was covered with a thick slimy coat of extreme foulness. The only space for the passage of food was a narrow interspace between the mass and the lesser curvature, where fluids and semi-

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solid foods could be forced from the cardia to the pylorus.

After discussing the history, statistics and clinical peculiarities of gastric and intestinal hairballs, and the results of surgical operations for their removal (which were eminently satisfactory), the speaker dwelt with special emphasis on the x-ray and the preoperative diagnosis of this rare condition. The great value of the fluoroscope and radiograph in the diagnosis was demonstrated by the exhibition of x-ray plates of this case and the reports of the few cases in which radiographic studies had been made in very recent years for diagnostic purposes.

By following the rules laid down by C. Thurston Holland of Liverpool (*Archives of Roentgen Rays*, July, 1913, and March, 1914), it was comparatively easy to make fluoroscopic diagnoses not only of a gastric tumor, but of an intragastric and detachable mass, which, if molded to the shape of the stomach, would practically rule out any other condition but a hair ball.

A RARE TYPE OF BLADDER ULCER IN WOMEN; REPORT OF A CASE.

By GUY L. HUNNER, M.D., Baltimore, Md.

The author reported eight cases of simple chronic ulcer of the bladder, and drew a sharp contrast between this and the simple chronic ulcer commonly described as of the Fenwick type.

These ulcers are classified as simple because of an absence of a demonstrable source of origin and because of the histologic picture of the excised ulcer.

They have all been located in the vertex or free portion of the bladder wall, as contrasted with the Fenwick ulcer on the base.

On cystoscopy they are easily overlooked because of the slight mucous membrane changes, and the attention may first be arrested by seeing one or two extra-pale white scar areas. Beside the scar area is seen a slightly hyperemic spot or a collection of a few fine bloodvessels, and on touching this area with an instrument or with a cotton pledget it readily oozes blood. At times the stretching of the granulating area incident to the ballooning of the bladder in the knee-breast posture causes a slight ooze and enables the area to be more easily found.

In spite of the very superficial appearance of these ulcers, they at times extend through all the coats of the wall and involve the peritoneum in thickening and adhesions.

Clinically they are characterized by pain, discomfort, urinary frequency, strangury, and loss of rest at night, together with their chronicity and resistance to all ordinary forms of treatment.

The urine in all the cases was macroscopically clear and normal, but a microscopic study of the centrifuged specimen revealed in each instance a few leucocytes and red blood corpuscles. In no case was there an associated bacteriuria. The ulcer may temporarily heal on the surface, when the urine becomes free of pathological elements until the surface is again broken. But one patient of the series had ever noticed blood in the urine, as contrasted with the Fenwick ulcer in which the most important feature is hemorrhage.

The diagnosis of this variety of simple chronic ulcer is fully established only after a failure to heal under ordinary forms of treatment, when excision of the inflammatory area with the entire subtending bladder wall results in a prompt recovery.

REPORT OF CASES.

By THOMAS S. CULLEN, M.D., Baltimore, M.D.

Case 1. *Calcified Lymph-Gland Producing Symptoms Somewhat Suggestive of Gallstones.* In this case, while making a right rectus incision for the removal of a chronic appendix, Dr. Cullen put his hand up into the gallbladder region to see if by any chance the gallbladder contained stones, as the patient, a woman, gave a history of jaundice on one occasion. He felt what appeared to be a gallstone and lengthened the incision upward. Situated at the junction of the cystic and common duct was a calcified nodule about 1.5 cm. in diameter. This gradually shelled out of adhesions and removed without either the cystic duct or the common duct being opened. On chemical examination it was found to bear no resemblance whatsoever to a gallstone. With hydrochloric acid and nitric acid it gave off carbonic acid. It was undoubtedly a calcified lymph-gland.

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Case 2. *Old Infected Abdominal Pregnancy with Extrusion of the Long Bones of the Fetus into the Bladder and Bowel.* The case was that of a colored woman, thirty-three years of age, who gave definite signs of pregnancy. Suddenly there was abdominal pain and escape of some blood. Shortly afterward a tumor was noted in the right lower abdomen. This gradually diminished in size. The patient was admitted to the Johns Hopkins Hospital several years later. At that time a peculiar lump could be felt in the right lower abdomen. This gave a distinct feeling of crepitus. On exploring the sac Dr. Cullen found a packet of bones, all that remained of the old pregnancy. One of the long bones projected into the bladder and was covered with phosphatic deposits. The ends of two other long bones projected into the cecum. After removing the sac and closing the opening in the bladder and the two openings in the cecum, a drain was placed in the pelvis. The patient made a good recovery.

Case 3. *Removal of a Large Tuberculous Cyst of the Mesentery of the Jejunum, together with a Corresponding Segment of the Bowel. Recovery; later Death apparently from Tuberculous Meningitis.* The patient was a frail child, five and one-half years old. A few weeks before coming under observation a tumor was noted in the midline in the upper abdomen. This was globular, about 10 cm. in diameter, and was supposed to be an enlarged kidney. There was a leucocytosis of 15,000. At operation the adherent omentum was loosened, the tumor gradually separated from adhesions to loops of small bowel, and an attempt was made to deliver it. Suddenly there was a slight escape of pus. The sac was turned out of the abdomen and evacuated. It was then clamped off and removed. It was found to spring from the mesentery, the bloodvessels supplying the jejunum also supplying it. The blood supply of the jejunum was partly cut off, and it was necessary to resect a large area. Both ends of the bowel were closed and a lateral anastomosis done. The cyst of the mesentery was filled with pus, and its walls consisted of typical tuberculous tissue, as shown on microscopic examination. The patient made a temporary recovery, but two weeks after operation developed a facial paralysis. She was able to go home, played around with other children, but about two months later developed a headache and became irritable; afterward there was pain all over the head and antipathy to light and later a comatose condition and opisthotonus. The patient soon died, evidently of tuberculous meningitis.

Case 4. *Operation for Radical Cure of Umbilical Hernia in a Patient Weighing Four Hundred and Sixty-four Pounds.* This patient insisted on operation, as she was practically a semi-invalid. The omentum was incarcerated in a large umbilical hernia, and the abdomen, with the woman standing, extended to the knees. There was in consequence marked traction on the colon, and she was almost doubled up like a jack-knife. Dr. Cullen removed a piece of adipose tissue of the abdominal wall, 36 inches from side to side and 19 inches from above downward, together with the hernia. The patient made a perfectly satisfactory recovery.

Case 5. *A Further Case of Adenomyoma of the Recto-vaginal Septum.* At the last meeting of this Association Dr. Cullen referred to the literature on adenomyoma of the recto-vaginal septum and reported two cases. Since then he has had another case. The growth was about 3 by 3 cm., and the rectum was intimately blended with the cervix. There was partial blockage of the bowel. The tumor on section proved a typical adenomyoma, the glands of the myoma being identical with the type found in the body of the uterus.

THE TREATMENT OF ANGIOMATA BY THE INJECTION OF BOILING WATER (WYETH METHOD).

By FRANCIS REDER, M.D., St. Louis, Mo.

The author stated that from statistics it must be inferred that the face was the favorite site of these neoplasms, two-thirds of them being located there. The brow and the cheek seemed to be most commonly affected. Next in frequency came the lips, the nose, the ears and the eyelids. Females were more prone to this affection than males, two-thirds of all cases occurring in the former.

When Dr. Wyeth advocated the injection of boiling water into angiomata as a curative agent, the author doubted very much if he was aware of the greatness of his beneficent advice. In a

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series of some twenty-six cases which had been subjected to treatment, he had had no failures to record. In every instance the results had been very gratifying. In most of the cases the lesion was upon the face and scalp; in four upon the tongue, ranging from the size of a filbert to that of an English walnut. One patient presented an angioma upon the left gluteal region, as large as a cocoanut, and another, a young man, eighteen years of age, had a fusiform angiomatous growth upon the right middle finger between the second phalangeal articulation and the knuckle. This tumor caused great pain.

All forms of operative intervention in these vascular tumors harbored the great danger of hemorrhage. In most instances this was alarming and exceedingly difficult to check.

In making the injection certain conveniences would expedite this measure. A suitable syringe was essential. He had found an all glass syringe, with a good shoulder, a large ring on the piston, and an asbestos plunger, to answer the purpose better than any of the many he had tried. A syringe with an all glass plunger has its drawbacks, inasmuch as the steam generated within the barrel would find its way between it and the plunger, thus inhibiting the free and easy movement of the piston, so essential to this procedure. The slip needle of small caliber was the preferable one. With it no time would be lost in the transference of the boiling water. It should always be borne in mind that the water must be injected at as near boiling temperature as possible, and time was an important factor. A pair of easy fitting chamoisette gloves of good thickness had served him well. That portion of the glove intended for the little finger was cut off, so that the degree of heat in the tissues could be judged by occasional contact with the little finger.

The arrangement in the operating room should be such that the surgeon stood between the vessel containing the boiling water, which was kept constantly at the boiling point over a flame, and the patient, at a distance that would not necessitate a step by the operator for the transference of the water into the tumor. The parts not involved in the growth should be protected with moist cloths, lest they become scalded by the hot water in the syringe being forced out by the generated steam.

The introduction of the needle and the force applied in injecting the hot water was of great importance. Inasmuch as the weak tissues of the new-growth did not offer the resistance of normal skin, which overlay the angioma, the hot water injected without great care might cause these tissues to break down. Injections made directly into the enlarged capillaries were invariably followed by a necrosis. For this reason, it was well to make the initial injections through the sound skin, about one-sixteenth and one-eighth inch from the edge of the angioma, well beneath the neoplasm, thus assuring coagulation of the deeper parent vessels. This was also a wise precaution against the dangers of embolism.

Judgment should be exercised in introducing the needle to prevent the point from resting too near the opposite wall of the tumor. To properly estimate this procedure it was well to first insert the needle without the syringe, and pushing it through the mass till it could be felt on the opposite side, then withdraw it to the extent of half an inch. This would give a reasonable assurance that the boiling water could be introduced into the tumor without the probability of sloughing. When the skin began to turn grayish in color, the injection into that area was to be discontinued. Hyper-distension must be most carefully guarded against. The quantity of water necessary to cause this bleaching rested wholly with the amount of tissue under treatment. After coagulation of this particular area had been satisfactorily accomplished, the point of the needle was made to penetrate into another and the hot water injected.

The quantity which might be introduced at one sitting would amount to three or four ounces in a tumor the size of a hen's egg, the time consumed in making the injection being about ten minutes. However, if the angioma was of unusual size, it would be advisable to treat only a portion of it at one time, making a subsequent injection two or three weeks later. It was a wise precaution to apply ice or very cold compresses to the tumor and surrounding tissues immediately after the proce-

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dure for the first four to six hours, thereby lessening the severity of the edema.

The course of an angioma successfully injected was one of gradual diminution, the greatest progress being made from the second to the third week. A tumor the size of a hen's egg would usually require six or eight weeks for its disappearance. If the injection had been a fortunate one, that is, free from any accident, such as cicatrization following sloughing, the site that once harbored the angioma would appear healthy and quite normal.

To illustrate the gratifying results of this hot water injection, the author cited two interesting cases.

NEW FACTS ABOUT CANCER AND THEIR CLINICAL SIGNIFICANCE.

By WM. CARPENTER MACCARTY, M.D.,
Rochester, Minn.

The author stated that in 1910 before this society he presented the first observations which tended to refute the origin of cancer in prenatal and postnatal rests. At that time the stages of epithelial hyperplasia were described as primary, secondary and tertiary.

In 1913—also before this society—the practical application of these terms to neoplastic conditions in the mammary gland was presented.

The object of these investigations had been the establishment of a scientific histological basis for clinical experience relative to benign, malignant and doubtful tumors of epithelial origin, and to suggest clinical, prognostic and operative procedures which would be standard for the pathologist, clinician and surgeon, and by which means needless, meaningless, confusing terminology and unnecessary radical operations might be avoided.

Since the terminology adopted as a result of those investigations had proved satisfactory and very simple in the case of mammary neoplasms, it had been decided advisable to extend the observations to other organs.

The prostate, skin and stomach had conformed absolutely to the facts and terminology.

The writer took this opportunity of presenting some facts relative to the histogenesis of cancer of the stomach, and to point out that in so far as the skin, prostate and stomach are concerned, the three cytological pictures and their terminology might be utilized in establishing a better understanding between the pathologist, clinician and surgeon in clearly defining benign, doubtful and malignant epithelial growths.

The proposed method, however, involved the undemonstrated danger of spreading a malignant disease by wide excision, both pathologist and surgeon agreeing that incision of neoplasms was bad and dangerous practice.

In doubtful cases wide excision produced a specimen which might be classified under three distinct and definite histological headings, each having a definite clinical significance and forming the basis of accurately defining the doubtful group of cases, which might be studied with the object of settling the correct operative procedure and the curative effect of operative surgery in its relation to epithelial neoplasms.

It might be suggested, therefore, that such a specimen, when removed by wide excision, be classified as primary epithelial hyperplasia, secondary hyperplasia or tertiary hyperplasia, the first being benign, the second doubtful, and the third malignant.

With our present knowledge, the first required only excision, if any surgical treatment; the second wide excision, and the third complete or radical removal.

In case the pathologist reported secondary hyperplasia, wide excision only was justifiable. It was this group which needed careful study because the exact outcome of such a condition could be accurately determined only by the post-operative histories.

This fact, it seemed to the writer, put the problem in a field of research which belonged to the surgeon, and forced him to standardize his operative procedures to histological findings.

It would be only by such standardization that the surgical pathologist, the clinician and surgeon would be able to scientificially co-operate in their efforts to render justice to the patient.

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Editorial Department

NEW YORK, JANUARY, 1915

ANTISEPSIS VERSUS ASEPSIS IN THE PRESENT EUROPEAN WAR.

It has long been a mooted question whether antisepsis or asepsis should prevail in the treatment of wounds, and while in more recent times the pendulum has swung in the direction of asepsis, the exigencies of the present war bid fair to carry it in the opposite direction. The management of bullet, shell, shrapnel or bayonet wounds on the battlefield is an entirely different proposition to that encountered in a hospital where the injured can receive the benefits of strict aseptic precautions. Modern aseptic methods are truly wonderful, but where so many thousands of wounded require attention as in the present conflict they have proved impracticable. Authentic reports from British, French and German surgeons show that one great scourge of this war is tetanus, and the outbreak of this most dreaded and fatal disease was only faintly anticipated until a large number of cases were observed in the military hospitals. The reasons for its occurrence are simple, however. The battles are being fought over agricultural lands that have been tilled so completely and for so long a time, with the accompanying use of fertilizers, that most of the soil contains tetanus bacilli. Injuries from bursting shells or shrapnel are in a much greater proportion than in most of the other wars, the result being that such wounds are wide and jagged, and contamination from the soil thrown up by the bursting shell or from the dirt on the soldiers' clothing is to be expected. Infection with tetanus bacilli is therefore liable to occur. It is in this class of wounds that the prophylactic use of tetanus antitoxin in addition to the antiseptic treatment is of great value. The chief causes of infection are: (1) There is often long and unavoidable delay in collecting the wounded and commencing treatment. (2) The wounds may be very large and complicated and almost impossible to disinfect thoroughly. (3) In a great many cases no attempt is made to secure disinfection, or if it is made it is utterly inefficient. The treatment of these wounds, therefore, must be considered under two headings according to the time at which they come under the observations of the surgeon: (a) those which can be treated during the first twenty-hour hours after their infliction, and (b) those which are met with at a later period, when sepsis and suppuration are already established. During the first twelve

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hours the great majority of wounds, unless they are large, irregular, or complicated with extensive comminution of bone, can be readily made aseptic, and if proper precautions are taken afterwards they will remain so. After from twenty-four to forty-eight hours the use of antiseptics is indicated, those chiefly employed being carbolic acid, bichloride or biniodide of mercury and iodine, although permanganate of potassium and hydrogen peroxide are favored by some military surgeons. The English method leans to the choice of carbolic acid in a saturated watery solution, 1 in 20, or an oily solution, 1 in 10. The Germans prefer bichloride solution 1 to 6000, or iodine. The antiseptic power of the latter is practically the same as that of carbolic; so that a 2 per cent. solution has the same value as a 1 in 50 carbolic lotion. In wounds of the second class free drainage and antiseptic dressings are employed, the best thing being salicylic acid gauze, with a layer of mercury cyanide gauze next to the skin to protect it. Thus the wound is sterilized and bacterial growth is prevented by the antiseptic. In wounds more than forty-eight hours old sterilization cannot be made complete by any form of local applications. In these cases the use of strong antiseptics and the mechanical removal of any considerable amount of tissue are contraindicated, as they tend to break down the natural barriers which have formed. Instead, continuous irrigation with normal saline solution seems to be the best of all methods, and drainage should be established by means of open rubber tubes, counter-openings being made if necessary. Here as before, the dressings should be antiseptic. Bullet wounds, on the other hand, are giving very little trouble, for the high velocity of the missile seems to sterilize the wound by the heat generated, so that if the parts are promptly protected by an antiseptic dressing (which all soldiers carry in the first-aid packet) the dangers of infection and tetanus are largely avoided.

The conclusions to be drawn are the following: (1) Injuries received in modern warfare should be handled as little as possible. (2) An aseptic dressing promptly applied to a bullet wound will prevent infection. (3) An antiseptic dressing should be applied to all lacerated and infected wounds. (4) Iodine, mercury and carbolic acid are still the antiseptics chiefly in use. (5) Under no circumstances should wounds be touched with the hand. (6) The aseptic method will never be discarded, but antisepsis will probably be employed much more than before.

EDWARD ADAMS, M.D.

ANENT TWILIGHT SLEEP.

At the time that the so-called twilight sleep was brought to the attention of the medical profession in this country, mainly through articles published in lay periodicals, we took occasion to express our resentment against this attempt to force a method involving the use of powerful drugs by a special and rather complicated technic upon American physicians before its value had been determined by our leading obstetricians. Since then this method has been tried in a number of lying-in hospitals, and according to the reports of competent observers the results have been sufficiently satisfactory to entitle it to a thorough investigation by those who were prejudiced against it at the start by the unethical manner of its introduction. A note of warning, however, has been sounded by everyone who has written on the subject that twilight sleep is adapted for use chiefly in hospitals, where the patient can be provided with the necessary environment and where she can receive the close and undivided attention of physicians familiar with the technic, from the time of the first injection to the completion of delivery. As Dr. O. P. Humpstone remarks (*Long Island Medical Journal*): "It is not a panacea for painful childbirth, in that it is not practical for use by the general practitioner, because the remuneration for the average obstetric work is too low to permit him to undertake so arduous and time-killing employment, if he is to exist and maintain his position in the community." Several general hospitals have already set aside delivery rooms for the investigation of twilight sleep, and doubtless, as the demand for it among the public increases, there will be a rapid multiplication of local obstetric institutions, with a staff of physicians and nurses trained in this procedure. To what extent this will affect the income of the general practitioner remains to be seen. For a complete exposition of the present status of twilight sleep we would refer our readers to the forthcoming January issue of *American Medicine*, in which this subject is discussed by a number of prominent obstetricians.

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Department of Railway Surgery

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THE ASSOCIATION OF SURGEONS OF THE SOUTHERN RAILWAY.
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ASSOCIATION OF SURGEONS OF THE SEABOARD AIR LINE RAILWAY.

APPENDICITIS AND EFFICIENCY AS THEY RELATE TO RAILROAD EMPLOYEES.*

By STEPHEN HARNSBERGER, M.D., Catlett, Va.

Past and Present. Less than a half century ago, I well remember the time, it was belly-ache, puke, purge—the victim lived. To-day, "one vogue, one vein, one air of thoughts usurps" our brain—it is appendicitis, surgeon, the offending part removed, to save the victim's life.

Surmise Rates the Appendix Useless. Who knows its office? The role of the internal secretions has not been mastered. The value of a distinctive physiological function of the appendix in digestion, nutrition and elimination may come to light. Robinson says the appendix secretes a hormone, which stimulates the cecum and causes peristalsis.[1] Saviné not only confirms this but declares that it also exerts a strong vaso-motor action on the peristalsis of the large intestines. We know that we save patients' lives temporarily, at least, by removing the hopelessly diseased appendix, but we do not know whether its removal in the milder cases shortens or lengthens life. That may take years to decide. Therefore it may be wiser, for the present, if we give more thought to the pre-appendicular stage and thus by the exercise of more caution resort to the radical expedient less frequently.

Surgery and Therapeutics. Heretofore the idea of operation in every case dominated the surgeon's advice and treatment. It seems now, after greater observation and experience, that there is reason to believe that milder measures may be effective in relieving the inflammatory trouble in many instances and in producing a virtual cure. In all cases where such patients remain free from symptoms for a reasonably long period, it is accepted as evidence of the absence of serious local irritation; and perhaps this is the more rational view, as it is scarcely possible that the condition is pathologically active while clinically quiescent. In my own work, the recurrence of the disease, under proper medical treatment and subsequent rational dietary, has been so infrequent that the danger of development in a given case is too remote to constitute in itself a reason for operation as a general procedure. For I cannot recall a single death from appendicitis, with or without operation, or from any condition simulating the disease. But while this is true, it is not my purpose to claim any superior knowledge or treatment of these cases.

Mars Life and Industrial Enterprise. Appendicitis is the leading serious intestinal disease of youth and early and middle adult life. It constantly begins to increase before the age of puberty, reaching its highest mark between the ages of 15 and 40, but continues high to 60, when it declines with the advance of old age. Excessive mortality ranges between 10 and 40. Of 7,022 deaths,[2] note how they run by age of decedent:

5 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59
596	1,585	1,445	1,139	863	627

Fortunately very young children and old people are rarely affected. We see then that appendicitis is primarily a disease of the vocational or producing age. It more forcibly than any other intestinal disease mars life and business when human industry should be most effective and free from interruption. It is for this reason that I force an everyday subject upon your time.

Depreciates Efficiency of Railroads and Employees. The Southern Railway system gives service to 59,000 officers and employees.[3] On the conventional basis of five to a family, this industry directly supports about 295,000 people. The death rate per 100,000 (registration area) in 1912 was 12. This would make the death rate among the employees and their families reach about 31. But not quite 2 per cent. of all surgical cases die. In other words, fully 98 per cent. of surgical cases live. On this basis we have 3,100 operable cases of the disease among the employees and their families. Now, we have at least as many cases, which is a very small estimtae, not operated upon but which apparently get well under therapeutic and dietary measures. This shows that there are among the employees of this railroad and their families every year 6,300 cases of appendicitis. We see what a menace it is to human life and what a financial loss to both individual and corporate interests. In respect to one or a dozen cases it seems a trifling matter, but brought out in its entirety—thousands of cases among the 59.000 employees and their fami-

* Read at nineteenth annual meeting of Association of Surgeons of Southern Railway, Washington, D. C., June 19, 1914.

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lies on one railroad alone—it is easy to see the significance of the happening of so many thousands of cases in a single twelve months. This loss of efficient labor, especially during the trying times of interrupted travel and traffic, with its added expense, is an item of cost, aside from suffering and death, not considered by the I. C. C., and of course not by the people, who are made to think by ranting demagogues that railroads scoop easy money. The purpose of this imperfect paper is to bring this question before you in an aspect not usually pictured, in the hope that we can in some way and at some time do something to lessen the incidence of appendicitis and by this means increase the effectiveness of the great army of men who strive hard to add to our comfort and to protect our safety. They stand toward the people something as we stand. We try to save the sick and injured from death. They try to save the well from injury and death. Railroad men as a class possess high sense of honor. They feel that they hold responsible positions, and feeling as they do, they court death rather than cause death by neglect of duty. The better shape we can keep them in, the better shape they can keep the millions in who travel and whose safety depends on their efficiency.

Importance of Early Diagnosis. We are all drilled in the classic signs of appendicitis. These signs pre-suppose an operation. The time to do most good, the really scientific time, is the perspective view that antedates the characteristic symptoms. For early and true information I have learned to depend upon what I call "postural symptoms." To quote from a former paper:[4] "With or without fever, muscular rigidity and with a minimum of pain or tenderness—in fact, with no pain to attract the patient's attention—if you have the patient lie first on one and then on the other side, you will find that he will complain of undue discomfort or increased pain when lying on the left side, and he is at once made more comfortable or entirely relieved as soon as he turns back on his right side. This postural procedure may elicit only disturbance or sensation instead of pain. This is always suggestive and in many instances indicates disease of the appendix or correlative parts."

When we fail to elicit this postural symptom in a patient with or without indigestion, especially with symptoms of disturbance in the upper abdomen which do not yield to the usual corrections of diet and simple medicinal remedies, we should make repeated abdominal examinations. It is particularly important that a patient should be examined every time he has an attack of pain, for if at such time the postural symptom elicits pain or any feeling of discomfort in the region of the appendix, it is the earliest and surest evidence that he needs the best professional advice and care as to his personal conduct and dietary.

Human Physiology and Pathology Seemingly Depend Largely Upon Habit, Custom and Food Processes. During the first fifteen or twenty years of my professional work I never saw nor even suspected a case of appendicitis. It is possible that at that time I was so ignorant of the clinical expression of the disease that I did not know it. However this may be, the harm was not the greater, because I had no patient in all those years die from any intra-abdominal disease with any of the present-day earmarks of appendicitis. Not until after the introduction of patent processed flour and other so-called refined foods did I see a case of appendicitis; and just in proportion as these refined foods have been consumed has appendicitis increased. Not because refined foods lack in high calorie values, the proportions of proteins, carbohydrates and fats, but by reason of the fact that they are deficient in the mineral salts, colloids and vitamines natural to unrefined foods and which are essential to promote the high functions of appropriation, assimilation and elimination. Without these *ions* we cannot have perfect nutrition. This is a chemico-biological fact. Perhaps the most common disturbance caused by the ingestion of demineralized food is constipation. If it persists we will have one or another destructive disturbance at work, particularly in the gastro-intestinal tract—one may be appendicitis.

Dryness Contravenes the Physiology of the Parts. It seems that constipation or any other continued irritation may cause destruction of the protective mucus. It is more than probable that dryness of the mucous membrane is a preliminary stage of appendicitis or pericolitis. If this be true, we should then recognize a pre-appendicular stage, in which there is likely to be a loss of mucous secretion or a toxic condition of mucous secretion. Why should this not be true? We know that the mucous membrane of the nose, throat, etc., becomes dry, then inflamed. Anything that tends to increase the

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mucus cures the condition. Why not the appendix? Do we not use salines to produce and procure moisture? Certainly there is a retrogression of function under continued demineralized food. Considering the problem from the clinical side, the all-important question, of course, suggests itself whether or not demineralized food has any relation to the pathogenesis of appendicitis. Theoretically, this is of course possible. Practically, it is made strikingly probable, even to the point of undoubted fact, by the seemingly beneficial influence of a course of English calomel, fresh Epsom salts, rest and a dietary of natural coarser foods. The stomach tires of "movie picture" bread and other emasculated foodstuff. Note [5] that the average grain of wheat contains 1.75 per cent. of mineral bodies, while the finest patent flour contains 0.44 per cent., which is about one-fourth the quantity in the grain. Brown sugar contains 1.97 per cent. of minerals, while refined sugar contains 0.01 per cent., or nearly 200 times less. Now, this is a fair picture of the way natural and refined foods show up in their content of mineral bases.

It is now an accepted fact that beri-beri of the Philippine Island is directly the result of living upon demineralized or polished rice. And it may be and most probably will be shown that pellagra in this country is in most part due to our increasing habit of consuming refined foods of high calorie but of really low mineral nutritive value. In other words, we Americans are fast sickening by reason of mineral starvation. We are spending millions to put down tuberculosis and yet we are spending more millions in the consumption of demineralized and chemicalized foodstuffs which lays us wide open to the development of tuberculosis—this and other diseases. All this tends to impaired vitality, not alone generally, but also of special tissues. The gastro-intestinal tract is no exception; but on the contrary is fully recognized as the special weak point in the chain of compensation, nutrition and repair. The cecum and appendix by reason of location and anatomical construction feel the brunt of digestive and eliminative errors. No wonder the appendix so frequently succumbs to the ingestion of irrational loads of exhausted foodstuffs and all manner of worse than useless beverages. The fact that the cecum is so bounteously blest with hypersensitiveness is more of a conservative than of an undesirable nature. It is nature's timely admonition and warning. The wise man hearkens and keeps health—the fool alone defies the scalpel and death.

Conclusion. Food minerals are essential to the phenomena of metabolism. Among other important functions they preserve the tissues from disorganization and putrefaction. The relation of food supplies to appendicitis demands more consideration. Even from a eugenic standpoint, it becomes a problem of vital interest—it is to be the living question of the day.

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REPORT OF CASES OF INJURIES OF THE HAND AND FOOT.*

By H. T. BAHNSON, M.D., Winston-Salem, N. C.

Having promised our Secretary to fill a possible gap in the program, I present a few recent cases that have come into my hands. Premising that the recipients of the injuries were men of good health and habits, I omit unnecessary details.

Case 1. Right hand mangled by a circular saw. All the soft tissues including tendons were torn completely off the back of the hand. The second metacarpal bone was fractured, and the medullary canal laid open about the middle for an inch or more. The third metacarpal was similarly injured, but not fractured. Deep lacerations of the thumb and forefinger extended into the palm. Under anesthesia I tried in vain to approximate the ragged ends of one or more tendons. As far as possible I drew the torn edges of skin over the denuded area, and held them in position by loose sutures of catgut, but they covered a very small part of the surface. The hand was placed on a well padded straight splint. Healing took place without sloughing or suppuration, and the man has a thoroughly useful hand, with only slight difficulty in extending his fingers.

Case 2. A brakeman had all the toes of the left foot crushed off at the metatarso-phalangeal articulation. The bony detritus was removed, the tendons sutured to the metatarsal bones wherever possible, and the soft tissues slightly approximated, leaving a large open wound. Failure to make an

* Read at nineteenth annual meeting of Association of Surgeons of Southern Railway, Washington, D. C., June 18, 1914.

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opening in the plantar tissues necessitated frequent changes of dressings. There was considerable sloughing and slight suppuration, but the man made a good recovery and is now working as a brakeman on the Southbound R. R.

Case 3. A similar accident befell another brakeman. In this case it was the right foot, and the distal end of the first metatarsal bone was also crushed. The wound was treated as in Case 2, but a drain was put through the sole of the foot, and despite extensive sloughing, there was no formation of pus. The man walks and runs without perceptible limp.

Case 4. A brakeman's foot was caught between the rail and a car wheel. The soft tissues were cut through, a jagged wound extending from an inch behind and below the external malleolus diagonally across the instep to the head of the first phalanx of the great toe. The bones were separated so that I could pass my fingers between the cuboid and the scaphoid and external cuneiform. All the metatarsal bones—their proximal ends holding together —were dislocated downward and inward, and the head of the second metatarsal was fractured transversely. The foot gaped like an open book and was horrible in its deformity. Only by cutting the part of the tendon of the tibialis anticus which is attached to the head of the first metatarsal bone, was I able to reduce the dislocation. Sutures of chromicized catgut through the apposing periosteal edges brought and held the various bones in position; the extensor tendons were replaced and sutured where necessary, and the outer tissues were likewise approximated as much as seemed safe. As I intended to keep the foot on the side, I did not make a counter-opening in the sole, but contented myself by placing a couple of folds of rubber tissue between the bones. There was extensive sloughing, but no suppuration. The foot is not pretty, but the man walks as well as ever, and ran away from his wife directly after settlement with the company.

Case 5. A brakeman on the Southbound R. R. had the end of the os calcis crushed off. All the soft parts from above the attachment of the tendo Achillis to the middle of the metatarsal bones were badly mangled, but there was sensation and circulation in the toes. The tendo Achillis was sutured to the periosteum on the sides of the os calcis and the mangled tissues gently supported by loosely tied sutures of catgut. There was very extensive sloughing, leaving a healthy granulating surface as large as the open hand, but no suppuration. In seven weeks the man was able to bear his weight on the toes of his foot. He is still under observation, and now has a margin of raw surface one-half inch wide surrounding the projecting bone, which will shortly be exfoliated. The tendo Achillis is firmly attached to the sound bone, and with a pad under his heel he will have a useful foot. He is now doing office work.

In all of these cases, realizing the gravity of the injury and the danger of a general infection, I was sorely tempted to do a more or less extensive amputation. The treatment I adopted may subject me to your criticism, which I answer by showing the satisfactory results.

My first step is to thoroughly drench every part of an open wound with alcohol. The smart is surprisingly slight and transient. Then under anesthesia I apply just as thoroughly the tincture of iodine, followed immediately by a second drenching with alcohol. The grime and dirt on the surrounding surface is removed by gasolene or alcohol, and the wound is then ready for a thorough examination. No water ever touches the wound. The dressing is saturated with alcohol unless there is an extensive raw surface, in which case I prefer a distillate of pine wood, variously named apinol, astyptodyne, pinecura, etc. It bears a relation to turpentine like gasolene to coal oil, and has marked anodyne and antiseptic properties. It does not adhere to the raw surface and stimulates granulation better than balsam of Peru. The dressing is changed only when absolutely necessary, and alcohol or the pine wood distillate is reapplied. Where a drain is needed I never use unprotected gauze, but prefer a folded piece of rubber or protective tissue, which can at any time be removed or replaced without pain. I may add that not one of the above patients required a single dose of morphia to keep him comfortable, and all of them were put on house diet as soon as the stomach would tolerate food.

ANNOUNCEMENT.

We have recently been informed by the Secretary of the Association of Seaboard Air Line Railway surgeons that the Committee on Awards for prizes for the best papers read before the annual convention held last October at Petersburg, Va., has reported as follows:

The first prize, consisting of a Surgical Instru-

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ment Cabinet, manufactured by the W. D. Allison Company, of Indianapolis, Ind., was awarded to Dr. H. Cuttino Dozier of Ocala, Florida, for a paper entitled "Larva Migrans;" the second prize, a Faught Blood Pressure Apparatus, manufactured by George P. Pilling & Son Company, of Philadelphia, was awarded to Dr. Jack Holton of Sarasota, Florida, for a paper entitled "First Aid to the Injured: Instruction of Railroad Employees in First Aid; the Necessity and Value of the Same in Railroad Accidents;" the third prize, a Diagnostic Head Light Outfit, manufactured by the Electric Surgical Instrument Company, of Rochester, New York, was awarded to Dr. E. H. Terrell, of Richmond, Va., for a paper entitled "Precancerous Lesions of the Rectum."

This announcement from the Secretary reached us too late to be included in our November issue, and as considerable space in the December number had to be reserved for the voluminous yearly index, its publication had to be deferred until the current issue. The presentation of prizes by the INTERNATIONAL JOURNAL OF SURGERY for the three best papers read before the annual meeting, as was announced at the convention, will continue to be a permanent feature.

Value of Epididymotomy.—Dr. E. P. Merritt (*Atl. Jour.-Rec. of Medic.,* September, 1914) advises epididymotomy in all cases of gonorrheal epididymitis which have passed beyond the stage of relief by other means. The technic which he recommends is as follows: 1. The patient is prepared by shaving the field for operation. 2. This is then painted with a 2 to 3 per cent. solution of iodine. 3. A 1 per cent. solution of cocain is injected in the skin for about one-half to one inch. The needle is then pushed straight into the tail of the epididymis so as to inject a few drops in it. This usually anesthetizes the field of operation thoroughly. 4. The scrotum is firmly held with one hand, using care not to press too hard, on account of causing pain. 5. An incision is made with a sharp-pointed bistoury through the skin beneath the globus minor from one-half to one inch in length. 6. Then several punctures are made in the globus minor with caution so as not to puncture the testicle. The incision is left open to drain, as sutures are not necessary. It is packed with a 5 per cent. iodoform gauze which is left in place for twenty-four hours. Dress with plain sterile gauze and apply a T bandage so as to keep the dressing in place.

Department of Genito-Urinary Surgery

PRACTICAL SUGGESTIONS IN SURGICAL DISEASES OF THE KIDNEY.

By LEWIS WINE BREMERMAN, A.M., M.D.,
Chicago, Ill.

Professor of Genito-urinary Surgery, Medical Department, University Hospital of Iowa.

Early diagnosis of renal affections is of paramount importance, not only from the standpoint of treatment but from that of prognosis as well. Frequently when symptoms are marked it is too late to gain much from treatment. This is particularly true in renal tuberculosis and tumor. It is my practice to have my patients consult me three or four times a year for a thorough physical examination, even though they are apparently well. I have no difficulty in accomplishing this, as I tell them that they consult the dentist frequently and it is much more important to consult their physician.

I have made early diagnosis in such cases when there were no symptoms evident. Don't forget that the patient may have pus or blood in the urine without there being symptoms that he may recognize. Pus or blood, even in microscopic quantities, is pathologic, and it is necessary for the physician to ascertain the source of the pathology.

He must resort to the use of the microscope, the cystoscope and the bacteriological laboratory. It may be that the general practitioner is not equipped for this variety of work, then it is my suggestion to call in consultation one who is equipped, as it may be of the greatest importance to the patient not to delay.

After pus and blood become macroscopic it is the sign of rather advanced trouble as a rule.

Cloudy urine does not always mean pus. The opacity may be due to an excess of some of the chemical constituents, as phosphates or urates. Remember that phosphates will clear up with the addition of acid, and that boiling the sample will dissolve the urates. The glass test, where the cloudiness is due to pus, will be of some importance in reaching an opinion regarding its source.

If the patient is instructed to pass the urine in two glasses, and the first glass is cloudy and the second clear, then the anterior urethra is involved.

If both glasses are cloudy then the condition

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may involve both the anterior and posterior urethra, or the bladder.

If a catheterized specimen drawn from the bladder contains pus, then the bladder or the upper urinary tract or both are involved. If this be the case, only the cystoscope with the ureteral catheter will clear up the diagnosis.

Cultures should be made to determine the bacteriology of the condition; from these vaccines can subsequently be manufactured, as they form, properly administered, an excellent adjunct to the treatment.

It is more difficult to tentatively arrive at an opinion from the character of the bleeding which may arise from some portion of the uro-genital tract.

Blood that precedes the urinary flow usually comes from the anterior urethra. That which follows the act of micturition, terminal bleeding, may come from the deep urethra or near the internal urinary meatus, forced out by the contractions which occur to evacuate the last few drops.

Where hemorrhage occurs in the bladder, the urine usually is distinctly red and there is a great tendency to clotting, which may produce tenesmus associated with considerable pain.

Where the bleeding comes from the upper urinary tract, the urine is usually dark in color; there is not so much tendency to clot, and the entire urine as it is passed is usually equally colored; whereas in bladder hemorrhage the last part of the stream may be pure blood.

These methods of course are not accurate, yet may lead to a correct opinion, but other modes of examination must be employed for absolute accuracy.

Pain in the region of the kidney is no criterion of the amount of pathology existing.

Pain in the right or left lumbar region may be due to other than a renal condition. It must not be forgotten that the seminal vesicles may be involved, and reflexly there may be pain in the back. The diseased prostate may produce backache, although this pain is usually situated lower, most commonly in the sacral region.

Pain located over one kidney does not mean that the organ on that side is involved. I have seen cases in which there was pain over the healthy kidney, while the organ on the opposite side, which was seriously diseased, gave no evidence of trouble.

I have seen a markedly enlarged organ, painful on deep palpation, with all the symptoms pointing to that side, to be free from pathology, the disease existing on the opposite side in the apparently healthy kidney. The enlargement and tenderness were due to a compensatory hypertrophy which had taken place to provide for the increased function of the organ.

One must therefore not depend too much upon the pain present for the location of the diseased kidney.

Stone in the ureter or kidney usually is not difficult to determine, yet great care should be exercised in all the methods of examination, as a positive diagnosis might be made where no stone exists and vice-versa. In ureteral or pelvic calculus the metal or x-ray catheter should be in the ureter prior to taking the x-ray picture, thus showing definitely the location of the stone and the course of the ureter. An excellent diagnostic method to employ in the detection of stone is to have the patient bend well over with the folded arms on the knees, then place the hand, palm down, over the kidney, striking the back of the hand with the fist of the other, a sharp quick blow. Stone in the pelvis will usually cause a severe pain in the renal region when this measure is employed.

Tuberculosis should be recognized early, to accomplish the best results. One must not be satisfied with superficial urinary analysis. Many slides should be examined for the tubercle bacillus, and if found a positive diagnosis is certain. Remember that the smegma bacilli resembles morphologically the tubercle bacillus, and one must be careful not to make an erroneous diagnosis. A catheterized specimen should be examined. The catheterization should be done only with careful surgical precautions. Guinea pig inoculations may be tried when microscopic methods have failed.

Tuberculosis of the bladder is always secondary either to a tuberculous process in the kidney or the genital tract. When vesical tuberculosis occurs, seek elsewhere for the source of the primary focus. Genito-urinary tuberculosis is always secondary to tuberculous lesions elsewhere

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in the body, although there may be no clinical manifestations.

An early diagnosis of renal tuberculosis is essential, as in the early stage the condition is unilateral, while later both kidneys become involved. As soon as the diagnosis is made and the condition found to be unilateral a nephrectomy is indicated, provided the other kidney is present, free from disease and functionating normally. The after-treatment consists of hygienic and dietary measures combined with the administration of tuberculin in regulated, gradually increasing doses over a long period.

Movable kidney occurs frequently without urinary symptoms, but when these are present, nephropexy should be performed for the purpose of preventing final destruction of the kidney.

The diagnosis of movable kidney should be made by palpation in the reclining and in the erect position, and also by the use of the x-ray in the dorsal and erect position, with the x-ray catheter in place and the renal pelvis dilated with an opaque silver salt for the purpose of showing the location of the pelvis on the plate.

For emphasis I will reiterate that in all kidney lesion an early diagnosis is essential. Every method of diagnosis must be resorted to for the purpose of benefiting the patient by being able to outline the proper course of treatment.

104 S. Michigan Ave.

Surgical Gleanings

Suprapubic Cystotomy.—Dr. T. Bratrud (*Jour.-Lanc.*, Dec., 1914) makes a plea for a more general use of this procedure in urinary obstruction from enlarged prostate or other cause when the patient is not a fit subject for radical operation. Cystotomy can usually be done under novocain anesthesia, one-quarter of one per cent. being infiltrated in the line of incision. Instillation of a one per cent. solution of hydrochlorate of quinin and urea into the bladder, one-half hour before operation, is of material assistance in reducing pain. It is preferable to use water dilatation of the bladder, and to incise this as high up extraperitoneally as possible. By following Rovsing's suggestion of applying one per cent. silver nitrate to all the exposed tissues before opening the bladder infection of the space of Retzius is avoided. In cases of contracted and hypertrophied bladder, where satisfactory distention cannot be secured, the peritoneal fold must be lifted out by dissection, local anesthesia being supplemented by a small amount of ether. Drainage of the suprapubic opening is obtained with a Pezzer catheter connected with a rubber bag. In 31 cases of cystotomy the author had but one fatality in a man of sixty with an inoperable carcinoma of the prostate.

Foreign Bodies in the Appendix.—Dr. Royale H. Fowler (*Long. Isl. Med. Jour.*, Dec., 1914) concludes: (1) Foreign bodies are present in the appendix in about 2½ per cent. of cases. (2) More than 52 per cent. of all foreign bodies are represented by the common domestic pin. (3) The habit of infancy and childhood, *i. e.*, placing everything in the mouth, is apparently responsible for about one-third of the pin cases. (4) Nurse maids, seamstresses, tailors and those whose occupations might predispose to this condition have rarely been victims of this form of appendicitis. (5) History of having swallowed the pin is rarely elicited. (6) The presence of a foreign body in the appendix is usually associated with inflammation. This may only be detected by microscopic examination. (7) Appendicitis associated with the presence of foreign bodies is more often chronic with recurrent attacks than acute. (8) In the majority of cases there is no reason to ascribe perforation of the appendix directly to the presence of the pin. (9) If histories are retaken in the light of operative findings, reconstruction will reveal fewer cases of foreign bodies in the appendix which have existed without symptoms referable to their presence.

Surgical Treatment of Facial Paralysis.—Dr. E. H. Beckman (*Jour. Mich. S. Med. Soc.*, Dec., 1914) considers it advisable in most cases of facial paralysis, especially where the injury of the nerve has been proximal to the stylomastoid foramen to attempt anastomosis of the distal segment to a healthy nerve trunk. The operation has been successful in paralysis resulting from mastoid operations, suppurative otitis media of long standing, fractures of the skull involving the petrous portion of the temporal bone, traumatic and operative injury after exit from the stylomastoid foramen and Bell's paralysis showing complete reaction of degeneration after several months' treatment. The length of time the paralysis has existed seems to have no effect upon the time required for recovery. In the Mayo Clinic, with which the author is connected, the divided end of the facial has been anastomosed with the main trunk of the spinal accessory. In three of the four operations performed in this clinic the end-to-end anastomosis was surrounded with a fresh section of vein which seemed to protect the sutured ends from the encroachment of connective tissue. The results were more perfect than in the one case in which the anastomosis was surrounded by fascia and muscle.

Radical Cure of Varicocele.—Dr. John O'Conor (*Lancet*, Dec. 12, 1914) says that if a little attention be devoted to the following maneuver there will be no reason to fear testicular atrophy. Standing on the left side of the patient for left varicocele he firmly grasps the whole structures of cord, midway between the external ring and testicle, between his left thumb and left index finger. Having assured

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himself that the vas deferens is securely fixed in its normal posterior position and the included skin between the fingers rendered taut, he makes a 1 to 2-inch incision over the bulging part. With a few horizontal strokes of the knife the infundibuliform fascia is exposed, and when this is opened the pampiniform plexus juts into the wound. With a little further dissection the presenting veins are thoroughly exposed through the whole length of the incision; these are now caught up in mass by a pressure forceps, and the handle of scalpel completes their isolation from the underlying structures. Catgut ligatures are then applied above and below, and an intervening segment (2 inches) of varicose clump excised. The stumps are approximated and the testicle elevated by tying the upper and lower ends of the ligature together (Bennett). The one, cardinal factor in this three-minute, three-instrument (knife, forceps, and needle) procedure is boldly to continue horizontal strokes with the knife, and not to relax the left thumb and finger grip until the pampiniform plexus pops into view.

Operation for Impassable Urethral Stricture.—Dr. C. H. Chetwood (*Surg., Gyn. and Obst.*, November, 1914) describes a new and rapid method for operating upon impassable urethral stricture. The operation is performed under local or general anesthesia, as preferred. A cannula and trochar, about 16 French caliber, is thrust just over the pubis in the median line, into the bladder, with the latter under distention, either with urine or antiseptic fluid forced through the urethra. When the trochar is removed, the fluid is emptied and the bladder is cleansed as before a cystoscopy. Now, through the cannula is introduced an indirect lense telescope of proper caliber to fit the tube. Through this the internal orifice of the bladder is viewed with absolute clearness. The distal aperture of the cannula is then applied to the internal orifice, the telescope removed, and a curved, flexible obturator is introduced through the cannula, which readily enters the prostatic urethra, and may be advanced as far as the apex of the prostate, or even the membranous canal. A finger introduced into the rectum determines the success of the procedure. The flexible obturator is provided with a fine interior lumen, through which a filiform or whalebone bougie may be introduced, which often finds the proximal opening of the stricture, and then may be advanced until it appears at the meatus. In such instances the remaining steps of the operation are much simplified. A perineal cut is made on the point of the obturator, the bougie guide is drawn through the perineal opening, and a small urethrotome knife with an eyelet is fed thereupon, toward the anterior section, and the strictured area is incised. In cases where it is not found possible to advance the bougie to the anterior urethra, the method of injecting an aniline blue solution is adopted, but through the canal of the obturator, while it is applied directly to the point of obstruction. In either of these instances the performance of the operation is simplified, and, as compared with the older methods of suprapubic retrograde urethrotomy or perineal section without a guide, its duration is surprisingly short.

Ostitis Fibrosa Cystica.—Dr. L. H. Landon (*An. of Surg.*, November, 1914) concludes that: 1. Benign bone cysts are much more common than formerly supposed. 2. Limited as true simple cysts, they are distinct entities, most probably dependent upon a localized ostitis fibrosa. 3. The cyst is neither concomitant nor dependent upon other disease. 4. They adhere more to the metaplastic picture than to the inflammatory or neoplastic, although they may result secondarily from a chronic attenuated inflammatory process. 5. Their etiology, unknown, seems in the large percentage of cases to be associated with trauma during the susceptible growing period of life. 6. They have little or no symptomatology prior to the stage of bone weakening, permitting spontaneous fracture or fracture from slight trauma. 7. Their chief importance lies in our ability to differentiate between them and other more serious lesions, mainly sarcoma; therefore recognition of their possibility, a careful history, local examination, with proper interpretation of the radiogram, are of the utmost importance. 8. The healing of fractures occurring at the site of cysts is uniformly good and may result in cure of the cyst. 9. Operative treatment, unless one can be quite sure from constant watching that the diagnosis is correct, is always justified. 10. Although in selected cases and in the hands of experienced operators resection with autogenous grafting has resulted favorably, curettement, crushing in of the walls and primary closure of the wound have been almost universally sufficient to procure a cure.

Thrombo-Angiitis Obliterans.—Dr. Leo Buerger (*Surg., Gyn. and Obst.*, November, 1914), in answering the question whether thrombo-angiitis obliterans is an infectious disease, presents the following summary of his views: First, that thrombo-angiitis obliterans is a disease in which an acute inflammatory lesion and occlusive thrombosis of arteries and veins are the characteristic lesions. Second, that from the mechanical point of view and from the standpoint of symptomatology, the thrombotic occlusion is the most important phenomenon. Third, that the thrombosis is probably preceded, and certainly accompanied, by an acute inflammatory or exudative stage. Fourth, that the lesion involves deep veins in about 40 per cent., and the superficial veins of the upper and lower extremity in 20 per cent. of the cases. Fifth, that recent investigations of the veins show that the acute lesions in the superficial vessels and then deep vessels are identical. Sixth, that the histological changes in the veins point to the existence of an infectious process. Seventh, that we believe that future studies should be directed toward the discovery of the causative agent in specimens cut out from the superficial veins when they are the seat of the acute thrombophlebitis. In this way it is hoped that the etiology of the disease may soon become revealed.

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Original Articles

INVERSION OF THE UTERUS.

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When applied to the uterus the term "inversion" is utilized to describe a pathological condition in which the organ is literally "turned inside out," although remaining attached to the normal surrounding structures. While inversion is designated as acute and chronic, according to the time when the patient comes under observation, no definite rules can be formulated in this particular, as conditions vary so widely in different cases. However, when the inversion has existed a sufficient length of time for characteristic tissue changes to occur in the uterine walls, it may be considered chronic regardless of the duration.

Pinard classifies uterine inversion as (1) immediate, i. e., produced during the second or third stage of labor; (2) recent, i. e., existing some hours or days later; and (3) chronic, i. e., existing weeks or months after labor. It has also been customary to describe inversion as partial and complete, depending upon the degree or extent of the protrusion.

From an historical standpoint it may be interesting to note that uterine inversion was clinically recognized and its etiology apparently understood by the ancients, e. g., Hippocrates (430 B. C.) furnishes a clear description of the pathology, and refers to treatment by manual reposition (taxis); Themison (50 B. C.) suggested amputation of the bleeding and sloughing corpus uteri, under the belief that the organ was practically unessential to the life of the individual; Soranus (110 A. D.) excised a gangrenous inverted uterus which was followed by recovery of the patient, and stated that inversio uteri might result from careless removal of the adherent placenta; and later literature contains frequent mention of the condition. As early as 1847 Crosse collected and tabulated four hundred cases, and the subject has been thoroughly studied by more modern writers.

To illustrate the infrequency with which uterine inversion occurs, the following hospital statistics are interpolated.* It will be noted a great diversity of opinion exists among the various observers:

Denham	claims	to	have	observed	1	case	in 100,000
Pinard	"	"	"	"	1	"	" 60,000
von Braun	"	"	"	"	1	"	" 250,000
Madden	"	"	"	"	1	"	" 190,000
Cache	"	"	"	"	1	"	" 4,600
Aveling	"	"	"	"	1	"	" 100,000
Hirst	"	"	"	"	1	"	" 140,000
Kehrer	"	"	"	"	1	"	" 2,000
Schonbeck	"	"	"	"	2	"	" 1,500
Krassowsky	"	"	"	"	1	"	" 200,000
Winckel	"	"	"	"	0	"	" 4,600
Beckman	"	"	"	"	0	"	" 20,000

Based upon the foregoing statistics the average would be about one case of inversion in 130,000 labors; but it is believed this does not represent the real frequency, as many cases occurring in private practice are not reported in the literature. Covering a period of twenty-two years, prior to 1911, Thorn (as quoted by Jones) collected a total of six hundred and forty-one cases of inversion from the literature of the world, and presented the most exhaustive statistical study which has ever been published. Of these six hundred and forty-one cases, 82.2% were obstetrical in origin, 13% were due to uterine tumors, 2.2% occurred post mortem, 2% were classified as "idiopathic" and 1.6% occurred after abortions or premature labors. Of the four hundred cases collected by Crosse, 88% were puerperal, 12% due to neoplasms and other causes.

As to age, inversion occurs most frequently in women between twenty and thirty years old, i. e., during that period when there are the greatest

* For the majority of these statistical data the writer is indebted to the admirable paper by Jones. See Surgery, Gynecology and Obstetrics, June, 1913.

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number of births, and multiparæ suffer slightly oftener than primiparæ.

Etiology: Of the primary and secondary obstetrical causes, the following are entitled to specific emphasis:

(1) Primary and essential—Uterine relaxation:
 (a) From so-called uterine inertia;
 (b) From mechanical failure of the musculature (paralysis).
(2) Secondary — Fundal pressure (above), funic traction (below):
 (a) From improper application of the Crede method;
 (b) From inordinate funic traction;
 (c) From naturally short or mechanically shortened funis.
(3) Other factors which contribute to uterine inertia:
 (a) From unduly prolonged labor;
 (b) From systemic debilitating disease.
(4) Purely idiopathic—Rare.

Of the recognized gynecological causes of inversion, only the following need be mentioned:

(1) Uterine neoplasms:
 (a) Fibromata—intrauterine, submucous and polypi;
 (b) Sarcoma, carcinoma.

It will be observed that the most important primary obstetrical causative factor is uterine relaxation from inertia or paralysis, which permits inversion to ensue whenever any of the secondary factors become operative. While the casual relationship between uterine relaxation and inversion has hitherto been prominently mentioned in the literature, its importance does not appear to have been sufficiently emphasized, nor fully appreciated. The occurrence of inversion seems improbable unless uterine muscular tone is markedly reduced, and this suggests a plausible explanation for the slightly increased frequency of the accident in multiparæ.

Of the secondary obstetrical causes, the improper application of the Crede method of placental expression and inordinate funic traction are responsible for more than 75% of inverted uteri following labor. It occasionally happens that the funis is naturally short, or is mechanically shortened by the fetus being envelop therein, and under such circumstances inversion may occur during the delivery. Where the labor is unduly prolonged the resulting inertia contributes to the production of inversion, and reduced vitality of the patient from any debilitating systemic disease may act in a similar manner.

The statement will bear emphasis that probably none of the secondary obstetrical causes, which are operative during or immediately following labor, are sufficiently active to induce inversion in the absence of the primary etiological factor mentioned, i. e., uterine relaxation. Obviously, however, in gynecological inversion this reasoning would be only partially applicable.

Little need be said concerning the gynecological causes: The most frequent is intrauterine or submucous fibroma. In this type the inversion develops gradually, the uterine wall is weakened by pressure of the neoplasm, atrophic changes supervene, traction upon the neoplastic attachments superinduced by contraction of the uterine musculature, contribute to the production of the inversion. The conditions are not dissimilar in any essential respect in the inversion due to malignant disease.

Diagnosis: Contrary to the generally accepted opinion, the diagnosis of uterine inversion is sometimes quite difficult of accomplishment. Numerous diagnostic errors have occurred, some of which resulted most disastrously to the patient. One writer (Walters) cites thirty-six cases where inverted (and prolapsed) uteri were accidentally excised during the puerperium, and adds that notwithstanding this treatment fourteen of the patients recovered! Another (Hoffman) states that in her anxiety to extract the placenta, a midwife made inordinate traction upon the funis, bringing away "the uterus, ovaries and tubes, and tearing the vulva and perineum as far as the anus!" It is said that in not a few more recent instances some of the most eminent surgeons, being unable to arrive at a satisfactory diagnosis, have removed inverted uteri by morcellement or excision, unsuspecting at the time the true nature of the pathology!

The possibility of inversion should be considered whenever there is present a uterine, cervical, or vaginal neoplasm. Even where microscopic examination of sections of the tumor reveals fibroma or sarcoma, inversion may exist as a com-

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plication. So great an authority as Velpeau (1841) said, in regard to the diagnosis of inversio uteri, that in some cases doubt was the only rational opinion, and Gooch had previously (1818) remarked that when partially inverted, the tumor in the smoothness of its surface, the roundness of its body, the narrowness of its neck, and its being encircled by the orifice of the uterus, sometimes exactly resembled a polypus of the fundus!

In the attempt to make a differential diagnosis there must be borne in mind fibroma, polyp, sarcoma, also exaggerated and complicated procidentia. While careful investigation should exclude the latter, in the former considerable confusion may occur, especially where there is no vulvar fundal protrusion. The tubal orifices are not always easily discoverable in the edematous endometrium, even where there is vaginal protrusion of the fundus uteri. The information to be gained by attempted employment of the sound may be distinctly misleading, since in the absence of inversion failure in its introduction may be due to an adherent fibrous cervical polyp. Moreover, acute incomplete inversion may occur following labor, with passage of the fundus through the os, yet the subinvoluted cavity may admit a sound to practically normal depth. In the presence of complete inversion introduction of a sound is manifestly impossible, and in partial inversion if complete involution has occurred the uterine cavity is likewise obliterated.

Another confusing feature may be the consistence of the inverted uterus from tonic contraction during manipulation. This may be suggestive of fibroma, especially if examination be completed without the induction of anesthesia. The demonstration of contractions in the protrusion previous to administration of an anesthetic, with complete relaxation afterward, constitute important diagnostic indications.

If the abdominal wall be thin, under the relaxation of anesthesia detection of a depression at the normal fundal site may be possible. While the external appearance and consistence of the protruding mass may not always be definitely characteristic, these signs will usually be sufficient to enable the surgeon to arrive at a satisfactory differential diagnosis between inversio uteri and neoplastic formation, provided the following points be remembered:

(1) That the interior (now the exterior) uterine surface presented externally is composed of edematous and thickened mucosa; whereas, the external surface of a neoplasm is essentially of a different character and oftentimes nodular.

(2) That when grasped with the hand the uterus—unless it be in a state of tonic contraction — diminishes in size and slight pressure causes exudation of bloody serum from the edematous mucosa; whereas, the size and consistence of a neoplasm remains unchanged.

In the observance of these diagnostic rules, however, in cases of long-standing inversion, due allowance must be made for the atrophic changes which may have occurred in the uterine mucosa. Accuracy in diagnosis is usually possible by painstaking investigation, and there should be little excuse for error on the part of the careful surgeon.

Pathology and Symptomatology: Under certain conditions untreated acute inversion may become chronic and persist for months or even years, provided no serious complications occur. One author (Tate) refers to a case of forty-two years' standing, in which reduction was easily accomplished. Instances of this kind, however, must be exceedingly rare. Of chronic inversions more than one-half are of obstetrical origin, the remainder being produced by uterine tumors. Practically all the acute cases occur during or immediately after the third stage of labor, the cardinal symptoms being hemorrhage, shock and pain. Local infection sometimes promptly ensues and is always a dangerous complication.

Vaginal examination reveals a soft, pear-shaped (sometimes) bleeding protrusion, the placenta being attached thereto in a certain percentage of the cases. In chronic inversion the symptoms may be greatly modified. As a rule the manifestations are less severe in character, provided infection, gangrene and sloughing have not ensued. The vaginal tumor is smaller and is less likely to bleed upon manipulation; vesical and rectal symptoms are not uncommon.

In gynecologic inversion the causative neoplasm is of preeminent importance, and of these cases Thorn found 25% partial and 75% complete. In all chronic and the majority of acute cases, the cervix is firmly contracted. The circulation be-

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comes seriously impaired, thus inducing marked edema of the corpus uteri, and if the blood supply is entirely obliterated, gangrene of the protrusion almost invariably occurs. Whether there is partial or complete vulvar fundal protrusion depends upon the degree of inversion. The tubal orifices may or may not be demonstrable, depending upon the extent of the inversion and degree of the endometrial edema.

Prognosis and Treatment: The prognosis as to life of the individual is always grave in acute inversion. The earlier the pathology is recognized and adequate treatment instituted, the more favorable the ultimate outcome. In untreated acute inversion death usually promptly ensues from shock, hemorrhage or infection. However, this is a rule to which there are many exceptions. As already intimated when the patient survives and the inversion becomes chronic, there may be little variation in the pathology or symptomatology for months or years.

The mortality in acute inversion is given by Beckman as 14%, McGlinn 70%, Kehrer 25%, Crosse 75%. In three hundred and ninety-nine cases of acute inversion mentioned by Thorn, sixty-four of the patients died—fourteen from shock, thirty-three from hemorrhage, fifteen from infection, and two from pulmonary emboli; in eighty-three cases of chronic inversion (caused by neoplasms, including four malignant) the mortality was 8.5%—one patient perished from hemorrhage, the others from cachexia and infection. In Crosse's four hundred cases (including acute and chronic) the mortality was 35%. Of one hundred and nine deaths in acute cases, seventy-two patients perished within half an hour to two hours, eight in from one to seven days, and six in one to four weeks. Of one hundred and four chronic cases, only seven of the patients died.

While certain of the symptoms outlined in the foregoing are present in the majority of cases, acute inversion sometimes occurs following labor without pronounced pain, hemorrhage or shock. This feature should always be borne in mind, as it has an important bearing upon the diagnosis and treatment. In any case where the patient complains of the slightest pain during placental expression, or if the procedure is followed by hemorrhage—unless the uterus can be outlined by abdominal palpation—immediate vaginal examination is imperatively demanded. In this connection, it would seem unnecessary to emphasize the ancient prophylactic dicta, that inordinate funic traction and improved application of the Crede procedure should be strenuously avoided.

The treatment of uterine inversion may be divided into (a) operative, (b) non-operative, and (c) mechanical. Manual reposition (taxis) is the most ancient procedure recommended (Hippocrates, 430 B. C.). Surgical intervention was advocated and practiced not very long thereafter (Themison, 50 B. C.—Soranus, 110 A. D.). Since that remote period, notwithstanding the comparative rarity of uterine inversion, there has been devised and practiced a veritable multitude of operative and non-operative measures. a complete resumé of which may be found in the admirable paper by Jones to which reference has already been made. To enumerate and describe the various methods with appropriate commentaries would unduly prolong this dissertation. therefore only a few of them will be briefly outlined.

Manual reposition (taxis): Spontaneous reduction of an acutely inverted uterus sometimes occurs, there being a few such instances recorded in the literature. In acute cases where manual reposition seems applicable, it should be undertaken immediately, i. e., before the supervention of marked cervical contraction and endometrial edema, otherwise it will likely be unsuccessful. Many methods have been recommended by various writers by which manual replacement may be accomplished, and as any of them may be followed by either success or failure, it seems unnecessary to specifically describe any particular technic. In the selection of the proper method much will depend upon the degree of inversion and the conditions present in the individual case. In any event, there may be a recurrence after complete reposition unless some kind of mechanical support be temporarily employed. Immediate manual reduction should be attempted in every case where it is possible, the patient being kept at rest and all straining interdicted. Pinard and others resort to the rubber-bag, tamponade, etc., only in the event inversion recurs. Of course where manual reduction becomes impossible, and especially where gangrene and sloughing have

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occurred, surgical operation is demanded. Operation is the only recourse in the majority of chronic cases (Pinard).

The following statistics covering two hundred and five cases compiled by Thorn (quoted by Jones, l. c.) show the relative frequency with which various non-operative methods were employed:

Manual reposition	166 times
Colpeurynter	16 "
Aveling's repositor	8 "
Tamponade and colpeurynter	7 "
Tamponade	5 "
Gariel-Galbin instrument	3 "
	205 "

In this connection it is interesting to note that Jones states the uterus was seriously injured in several of the cases treated by non-operative reposition, therefore it would appear that such treatment is not entirely devoid of danger.

Conservative surgical treatment: The greatest interest concerning the treatment of uterine inversion centers about the employment of operative methods, and an infinite variety of both conservative and radical procedures have been advocated. In a resumé of the conservative measures, Crossen gives the following in chronological order:

(1) Multiple incisions into the constricting cervical ring (Aran, Sims, Barnes, 1861).
(2) Dilatation of constriction ring by dilator introduced through an abdominal incision (Thomas, 1869, and with incisions Everke, 1899).
(3) Dilatation of constriction ring by dilator introduced through incision in fundus (Browne, 1883).
(4) Division of constriction ring and adjacent uterine wall and cervix, posteriorly (Küstner, 1893).
(5) Complete division of posterior uterine wall and cervix (Piccoli, Morisani, 1896).
(6) Complete division of anterior uterine wall and cervix (Spinelli, 1900).
(7) Division of constriction ring posteriorly through an abdominal incision (Haultain, 1901).
(8) Division of constriction ring anteriorly through an abdominal incision (Dobbin, 1905).

Crossen believes vaginal operation is by far the safer plan. Complete division of the anterior wall of the cervix and corpus uteri (Spinelli method) he thinks is altogether the most satisfactory method, and is the one he would strongly recommend in long-standing cases.

Radical surgical treatment: For many years, following the suggestions of Themison and Soranus, it was the practice to excise the corpus uteri in every case of inversion where reduction could not be accomplished by taxis. More recently, however, vaginal hysterectomy has been substituted for excision, especially in the radical treatment of chronic cases.

In deciding upon the method of operative procedure, the age of the patient is entitled to first consideration, regardless of the time inversion has persisted, since the preservation of a functionating uterus is of the greatest importance in women who have not passed the child-bearing period. Therefore, in young women the uterus should not be sacrificed, provided the inversion can be reduced by taxis, cervical incision, vaginal hysterotomy, etc., unless extensive infection or gangrene has already supervened, thus making complete hysterectomy imperative as a life-saving measure. In older women, where preservation of the uterus is not so important, especially in long-standing inversions, excision or total hysterectomy is the most appropriate treatment. Attempted reduction of the inversion by manual means through an abdominal incision has been followed by a high mortality, and the method is not to be recommended. Moreover, after opening the abdomen reduction of the inversion has in some cases been found impossible and hysterectomy became necessary. The uterus may be extirpated by either the abdominal or the vaginal method, according to the judgment of the surgeon, but all things being equal the vaginal route should be selected, since the mortality is much less. In certain cases simple vaginal excision of the protruding mass with suture of the stump constitutes the most appropriate method of treatment. For instance, Anspach reports a case in which the simple plan of excising the inverted mass was adopted because of the lessened danger of infection and the undesirability of removing the adnexa which were normal. The pedicle was compressed by means of large hysterectomy forceps, and after excising the necrotic mass the forceps were left in situ. He believes forceps are safer than sutures because there is less liability to infection of the peritoneum.

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According to Stark, the only treatment of chronic pathologic inversion worthy of consideration is the removal of any tumor present, and either hysterotomy or hysterectomy. Hysterotomy is the operation of choice when the patient is a young parous woman. It is contraindicated and hysterectomy must be performed (a) if a malignant tumor is present; (b) if there is either thickening and hardening of the uterine wall or softening and atrophy of the musculature, and (c) if there are dense peritoneal adhesions "binding down the uterus or fixing the bladder or rectum." Contrary to the views of other observers, he concludes that if hysterectomy is decided upon, the abdominal rather than the vaginal route should be selected, and this plan is also followed by Friedman.

It has fallen to my lot to have seen two cases of inversion of the uterus. One was acute immediately following delivery of the placenta, the other chronic of over four years' standing. Both occurred in very young women and in the first labor.

The acute case was seen with the late Dr. John G. Cecil, in 1902. The patient was a thin, delicate looking woman, twenty-three years of age. The labor had been tedious, and after the head had remained in the inferior strait for nearly two hours, delivery was accomplished with forceps. The placenta not being extruded after waiting half an hour, the Crede method was practiced, and it was quickly expelled. Immediately following its removal, a copious hemorrhage occurred. Digital examination revealed an inversion of the uterus, which we succeeded in promptly reducing by means of taxis. No tamponade was applied. The patient made an uninterrupted recovery, and six years later bore a second child. The labor in this instance was normal and of about two and a half hours' duration. There was no recurrence of the inversion.

The second patient, sent to me from Russell County, Kentucky, June 13, 1914, presented the following history: She was twenty-two years of age, married December 24, 1907, her child having been born January 29, 1910. She said her "labor was very hard, and that she was unconscious for nearly a week," but was delivered without the aid of forceps. The placenta was removed by the physician "within a half hour after the birth of the child." Immediately thereafter the physician noticed a tumor larger than a goose egg protruding from the uterus. There was not a great deal of hemorrhage following the labor, and the patient did fairly well without much hemorrhage for two months. The "flow" then became excessive and almost continuous, lasting a month or two, with intervals of only a week or so, until the time she presented herself at my office.

When I saw the patient she looked to be almost exsanguinated. Digital examination revealed a tumor slightly larger than a goose egg which bled when manipulated. Not being able to locate the os uteri, I concluded it was a case of chronic inversion of the uterus. The patient was sent to the Sts. Mary and Elizabeth Hospital, and two days later, while under ether preparatory for an operation, I had Drs. John K. Freeman, Simrall Anderson, W. B. Doherty, and C. G. Forsee, examine her, all of whom concurred in the diagnosis of inversion.

Owing to the congested and edematous condition of the mucous membrane, which bled freely upon manipulation, and the almost bloodless condition of the patient, it was decided best to simply perform a vaginal excision of the uterus near the constricted portion, and to close the stump with twenty-day catgut sutures. This was accordingly done, and the stump left appeared to be about one and a half inches in length. The patient made a satisfactory recovery, leaving the hospital, for her home, at the end of two weeks. I have a letter, dated August 29, 1914, from her husband in which he says: "My wife's health and strength are steadily improving."

NOTE: For many of the data incorporated in this paper, particularly those relating to the history and statistics of uterine inversion, the writer is indebted to the exhaustive contributions of Drs. Jones, Crossen and Friedman, which are mentioned in the list of references appended hereto; and it is desired that full credit be extended, with thanks to both authors and publishers, for the privilege exercised in abstracting and epitomizing the material herein utilized.

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TREATMENT OF SHOCK.*

By A. W. COLCORD, M.D., Clairton, Pa.

The subject matter in the following (final) chapter on "Shock" has nearly all been anticipated in previous chapters. Yet these principles are so important that it seems they will bear repeating for emphasis. At any rate, they will form for the reader a convenient summing up of treatment.

I have grouped the cases into two rather arbitrary classes—operative shock and traumatic shock. These are one and the same condition, yet differing in some details. Operative shock occurs usually during a general anesthetic or immediately on coming out. Traumatic shock is often found and must be treated far from a well regulated hospital—at the roadside, in a private house, in a mine, a mill, or on a railway train. Its treatment calls for the greatest coolness, promptness and skill; often tact in handling the friends and onlookers; the power of suggestion; and that rare faculty, found only in the real surgeon, the ability to adapt oneself to adverse surroundings and make the most of the (often) inadequate instruments, dressings and remedies at hand.

I. **Operative Shock.** For the treatment we may conveniently divide it into three grades: Mild, moderate and profound.

1. *Mild Shock.* If everything is done to prevent shock and if the principles of anoci-association are carefully applied, operating-room shock should be very rare. During an operation, watch constantly for the first signs of shock. A sudden rise in blood-pressure or pulse is a danger signal. If then the blood-pressure suddenly falls and other signs of mild shock follow, the patient should be carefully watched and the operation made as short as possible.

For mild shock it will be sufficient at the end of the operation to give a Murphy enema, and place the patient in bed with external heat and rest. If there is pain on coming out of the anesthetic, give morphia q. s.

2. *Moderate Shock.* If signs of deeper shock come on—shallow respiration, relaxed skin and muscles, rapid pulse, and low blood-pressure—we should at once stop the operation and begin active measures to combat shock.

An intravenous saline with adrenalin, as described before (*Int. Jour. Surg.*, Aug., 1913, p. 276), will act more promptly than the Murphy enema and had best be used here. The patient can have his head at once lowered on the operating table and in that position can be carefully removed to a nearby quiet room. Raise the foot of the bed 18 to 30 inches and keep it there several hours if necessary. Bandage the extremities and abdomen. If there is oxygen hunger, as shown by the character of the breathing or by cyanosis, give oxygen. If there is pain, give morphia—*enough* to stop pain, restlessness and anxiety.

Most cases of mild or moderate shock recover, even without the vigorous measures outlined above. It is in the deeper grades that we can sometimes save life.

3. *Profound Shock.* The symptoms are here the same as described under moderate shock, but the blood-pressure is lower, the pulse more rapid and thready, the respiration shallower and more sighing. The cyanosis of lips and finger tips shows the greatly weakened circulation. There is greater relaxation of skin and muscles, the eyeballs sink into their sockets, the lower jaw drops, and the extremities are cold.

We must do promptly all the things outlined above in the treatment of moderate shock. In addition to these, one thing more remains, a measure which in Crile's clinic has saved many lives—transfusion.

The tendency of saline or a similar fluid to leak out of the bloodvessels has already been mentioned. Unfortunately, the greater the shock and the lower the blood-pressure, the worse the leak. Not only does the fluid leave the bloodvessels, but it goes where it does much harm, filling the walls of the viscera and especially the diaphragm, thereby greatly embarrassing respiration. We need a fluid that will not leak out—that will sustain blood-pressure till the exhausted centers can recover. Such a fluid is human blood.

Transfusion on the human subject was first performed by Denys of Paris in 1667. However, not much use was made of it till 1840, when Mr. Lane (*The Lancet*, 1840, p. 186), "finding a lad drained of nearly all his blood and on the point of death, injected into a vein of his arm about five ounces and a half of blood freshly drawn from a healthy young woman. The lad rallied and . . . had

* This is the final article in the series on "Shock," the last having appeared in the June, 1914, number.

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no return of the hemorrhage." A little later we find Dr. Blundell of England and Dr. George R. Fowler of New York making extensive studies in transfusion. Dr. T. G. Morton, of the University of Pennsylvania, reported fourteen successful cases.[1] Most surgeons of that day preferred defibrinated blood.

It was not until Crile[2] made his studies in transfusion that it became extensively used in shock. He showed us how to do it without danger of coagulation, and since the perfection of his transfusion technic he has discovered his pneumatic suit.

For interesting studies in transfusion we are also indebted to Carrel. For researches in hemolysis in

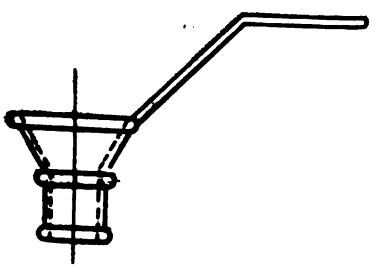


Fig. 1. Crile's anastomosis cannula (4 times actual size).

transfusion, see Funke; also Pepper and Nesbitt, who report a fatal case.

To do a transfusion, we must have:

1. A healthy donor willing to give his blood for the patient's sake.
2. Transfusion apparatus and instruments.
3. A clean operating room.
4. At least one assistant.
5. A knowledge of the technic of the operation.[3]
6. The consent of the patient or of his immediate relatives if possible.

I quote from Sloan[4], who gives practically the method used in Dr. Crile's Clinic at the Lakeside Hospital:

"Arbitrarily if we cannot maintain the pulse at or below 140 we have found it necessary to give new blood. Let your donors be men, as the radial artery is larger. Lanky individuals have fewer anastomosing branches coming off the radial. There is no danger of hemolysis when both donor and recipient are in good health. The possible presence of agglutinins may be disregarded. Novocain 1-400 makes the best local anesthetic. A superficial skin injection for eight cm. over the most prominent portion of the radial is made. Then the deep tissues along the vessels are infiltrated, introducing the needle at right angles to the skin and injecting as the needle goes deeper. There is very little danger of puncturing the vessel. This procedure completes the anesthesia as well as making the subsequent dissection easier. Massaging the area for a few seconds spreads the novocain evenly. It is best to ligate each little branch coming off the radial so as to make the dissection bloodless, and one should use very sharp knives. Do not tie the radial until just before slipping the artery over the vein. It may

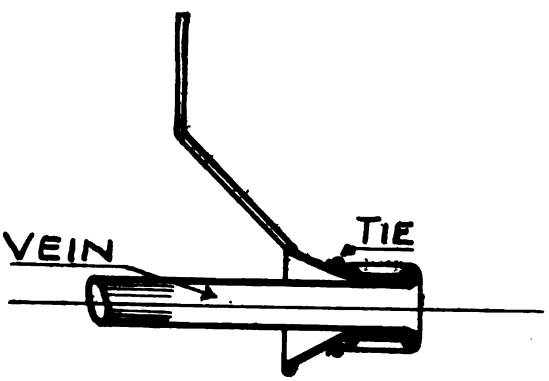


Fig. 2. Vein drawn through cannula, cuffed back and tied at second notch.

be necessary to dilate the artery with a mosquito hemostat smeared with vaselin. A vein is selected from the forearm of the recipient just large enough to cuff over the largest canula that the exposed radial will take. The vessels must be handled very gently, using no traction and keeping the anastomosis warm with saline solution. Vein to vein anastomosis is an easier procedure, but the blood flow is slower. The pressure in the donor's arm veins may be raised by using just enough compression above the elbow so as not to cut off the arterial pulse; Bunt's pneumatic tourniquet is admirably suited for this purpose. It is wise to interrupt the blood flow every few minutes for a minute in order not to overtax the recipient's heart; for in case the blood flow is too rapid it may dilate. Acute dilatation is shown by respiratory distress, cyanosis, increase in pulse rate, lessened pulse volume. On percussion the diagnosis is confirmed by finding the cardiac dullness enlarged to the right of the sternum. The remedy is to lower the feet and press several times over the chest to help empty the heart. Continue the blood flow until the recipient's blood-pressure is

[1] Surgery of the Pennsylvania Hospital, 1880.

[2] "Hemorrhage and Transfusion," by Geo. W. Crile, M.D., 1909.

[3] An excellent description of the technic may be found in "Keen's Surgery," Vol. V., pp. 616-618.

[4] "Surgical Application of Pathological Physiology in Shock." By Harry G. Sloan, M.D., Cleveland. Cleveland Medical Journal, September, 1911.

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raised 20 to 30 mm. Hg. or the pulse rate falls with an increase in pulse volume, the compression bandages over the lower body having been gradually cut away and the patient's feet lowered. The blood flow must be stopped when the donor shows the first paling of the lips, which is best seen at the junction of the vermilion edge and the skin. It may take 45 minutes' flow to cause this. Much may be done for his comfort by giving ¼ gr. of morphia hypodermically before the operation and by having the table on which he lies well padded. If the patient is in bad condition it is better to transfuse and complete the operation at once. Use tincture of iodin in sterilizing the skin, as it saves time for the surgeon

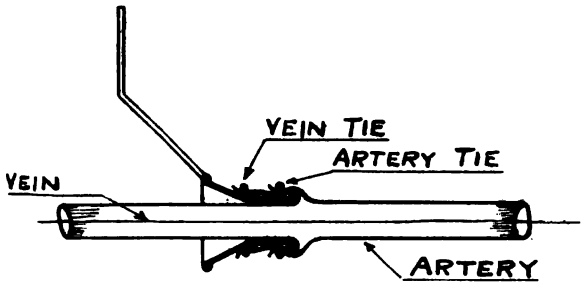


Fig. 3. Artery drawn over vein and tied at first notch.

and much discomfort for the patient. Nitrous oxid anesthesia will cause the least damage. Block all tissue to be cut with novocain 1-400 or cocain 1-1000 just as though one were doing the operation under local anesthesia alone. Block the nerves encountered as far central as possible. If nitrous oxid is not to be had the next best anesthetic in crushes of the legs is spinal anesthesia. After withdrawing 10 c.c. of spinal fluid substitute 10 c.c. of a solution containing 40 mg. of novocain and two grams of granulated sugar. The upper part of the patient's body must be kept elevated 30 degrees for an hour after the injection."

II. **Traumatic Shock.** In shock from severe injuries the same general principles as those laid down under operative shock should be followed:

1. Let there be prompt and complete hemostasis. In all large industrial plants, in mines and on railroads, stretcher crews and first-aid classes should be well drilled in stopping blood.

2. Impress on nurses, assistants and internes the importance of morphia at the *earliest possible moment*, as it prolongs the period before profound shock comes on and gives us time to operate.

3. Give the patient mental and physical rest. In severe accidents, such as railroad accidents, if you cannot get the crowd away from the patient, take the patient away to some quiet place—a warm room, if possible, which should be cleared of all unnecessary furniture. Emergency hospitals should be built with a dead room well removed from the one where injury cases are received. After accidents where some are killed and some severely injured, the presence of the dead and their weeping friends adds to the shock of the living.

4. External heat, position, pressure on limbs and abdomen, intravenous injection, or transfusion, as indicated. I have found the electric mattress and warming pads useful for applying heat.

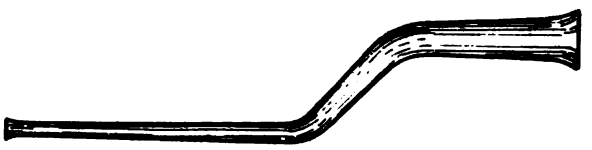


Fig. 4. Brewer's glass tube lined with paraffin.

5. In all emergency hospitals or stations there should always be kept in readiness:

(a) Oxygen tanks.
(b) Pulmotor or lungmotor.
(c) Sterile stock solution for normal salt solution.
(d) Intravenous set.
(e) Hot water bottles or other means of applying heat.

6. Operate, if possible, *before shock comes on.* This is better done, even in a private house, if the patient is seen early enough, than to risk the delay and further injury of shipping to a distant hospital. In the writer's opinion, the added risk of sepsis is far less than the risk of death from shock when there is delay in severe crushing injuries. Block all large nerves, use plenty of local anesthesia, use ether or gas and work rapidly and gently. Remember that in shock every dram of blood is precious.

7. Never use measures to raise blood-pressure till all hemorrhage, either open or concealed, is stopped.

8. If, after a severe injury, the patient is not seen till in deep shock, it may in some cases be best to wait for a reaction before operating. This is a

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much debated point, but must be decided by the surgeon, taking all facts into consideration, and treating each case as a separate problem.

9. Cultivate in yourself a personality that inspires confidence. Learn to suggest away the patient's fears. This faculty will be worth much to you in your general or surgical practice. In shock, it will help you to save life.

SHOCK IN BURNS.

In my opinion, shock in extensive burns[5] is due to several factors, the most important being the following in the order named:

1. Psychic effect of a severe accident with added excitement from surrounding friends and by-standers.

2. Severe sudden pain.

3. Rapid toxemia from absorbed poisons in the sick area, partly from hemolysins and partly from chemically changed lymph in the lymph spaces.

4. Reflex nerve phenomena from injury in the burned area of: (a) nerves of pain; (b) nerves of temperature; (c) vasomotor nerves.

5. Rapid congestion and embolism of vital organs. Autopsies on cases of death, apparently from shock in burns, even a few hours after the accident, show intense congestion of meninges, kidneys, lungs, stomach and intestines, with emboli of clumps of red blood corpuscles throughout these organs. (Ravogli.)

In a series of cases treated by the writer, there were, in 2,000 cases, eleven deaths, all but one during the period of shock.

Let us suppose we are called to treat a severe burn of the second degree. We find the patient suffering agonizing pain with oncoming shock and a chill. We at once administer a hypodermic of ¼ to ½ grain of morphia, and 1-100 to 1-50 gr. of atropin to stop his pain and apprehension and combat the shock. We then see that the room is warm—80 to 85 degrees—clear it of unnecessary furniture and by-standers and order hot water bottles, or hot bricks, gotten ready. The bed should also be prepared. If we have a nurse or assistant at hand, we can order her to prepare the necessary things for a hypodermoclysis or a Murphy enema.

We must bear in mind that in every bad burn three things are more important than the local treatment:

1. Stop pain.

2. Combat shock.

3. Provide for dilution and elimination of the toxins, which at once are thrown into the blood.

The ointment used by the writer is a local anesthetic and aids greatly in stopping the pain.

Pieces of gauze of convenient size are now spread thickly with the ointment and applied somewhat beyond the burned areas. Over this cotton and over all a bandage is placed. The patient is now put to bed, and if shock continues the normal salt solution is repeated every eight hours, giving plenty of water to drink. Nourishment for the first three days should be liquid on account of the intense congestion of the alimentary tract. Then we may gradually feed according to conditions.

There should be the usual care of the bowels, skin, kidneys, etc., not forgetting, in our zeal over the local treatment, that we have on our hands a sick man with blood loaded with toxins, with meninges, lungs, stomach, kidneys and other organs congested and filled with emboli.

[5] Adapted from writer's paper on "Burns and Their Treatment." Int. Jour. of Surg., May, 1911.

SURGICAL CLINIC AT LEBANON HOSPITAL.

1. Fracture of Patella. 2. Dislocation of External Semilunar Cartilage and Fracture of Patella. 3. Intestinal Stasis; Chronic Constipation. Prolapsing Hemorrhoids. 4. Pyonephrosis; Nephrectomy.

By PARKER SYMS, M.D., F.A.C.S., New York.

Case 1. **Fracture of Patella.** Abstract of history from the hospital records (Case No. 47,899): John K., aged 42, admitted November 23, 1914. Family and past history, irrelevant.

Present History: On day of admission patient slipped, and in trying to recover his balance he felt something give way in his right knee and then fell. He was able to walk with support, but complained of severe pain in the right knee.

Physical Examination: On admission to the hospital, his right knee was swollen and ecchymosed. Palpation revealed a transverse separation between two fragments of the patella; tenderness and crepitus on approximation. The x-ray showed a transverse fracture of the patella with a considerable separation of the upper and lower fragments and

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with a marked forward rotation of the upper end of the lower fragment.

Remarks: Fractures of the patella may present themselves as of two distinct varieties and, strange to say, we have an example to-day of each of these two. The first and most common class is composed of those cases in which fracture is produced by violent muscular action, a sudden spasmodic contraction of the quadriceps extensor muscle actually tearing the patella in two. The second variety is that in which fracture is produced by direct violence, for example, by a fall upon the knee or by a blow directly upon the patella. Sometimes we have a combination of the two; that is to say, there is a fracture produced by direct violence and a pulling apart of the patella by muscular action. In these combined cases either cause may have preceded the other; that is, we may have had a fracture by direct



Fig. 1. Patella fractured by muscular action, showing rotation of lower fragment.

violence followed by the laceration and separation of the fragments by muscular action, or we may have a fracture by muscular action and a subsequent fracture of one of the fragments due to the patient falling upon his knee after the patella had been torn in two. This latter condition is very rare.

These two varieties present two very different pictures. In cases of the first class there is wide separation of the two fragments of the patella. In cases of the second class usually but little separation exists and also frequently more than two fragments are found. There may be a stellate fracture, made up of many fragments, but these are held together owing to the fact that the quadriceps tendon has not been torn. In the first class of cases, not only is the patella pulled in two, but by continuation of the muscular force there is a laceration of the quadriceps tendon on either side, involving those fibers which come from the vasti muscles. The line of fracture and the line of lacerated tendon are never on the same level. There is a fringe or flap of tendon projecting beyond the lower edge of the upper fragment. This flap dips down like a curtain between the two fragments and interferes with their apposition and consequently prevents bony union from taking place, unless this condition is remedied by means of an open operation. In the second class of cases where there is little or no laceration of the tendon, the fragments of bone are naturally in apposition, and bony union does occur. Thus we find in treatment without operation that in the first class of cases there will eventually be wide separation of the two fragments, sometimes two or three inches; while in the second class there will be bony union and, of course, no separation of any fragments. In this second group, operation is almost never indicated, and it is in the first that we must consider its advisability.

There are two methods of treating these cases: (a) By the old method, by immobilizing the joint, preferably by means of a trough splint, and a gradual coaptation of the two fragments by means of properly applied adhesive straps. This method practically never results in bony union. There is a consequent gap between the two fragments of the patella. The continuity of the tendon is established entirely by fibrous tissue. Sometimes the fragments pull apart two, three or more inches, and yet there may be a fairly satisfactory result as far as function is concerned, though the patient will always have a weak knee. This condition is always a predisposing cause of subsequent fracture of the patella. (b) The other method of treatment consists in an open operation, exposing the seat of fracture and lifting the interposed fibrous curtain, bringing the fragments into apposition and securing them in place by some form of suture, and suturing the lacerated quadriceps tendon. The results after successfully performed operations are ideal. Bony union is obtained and, of course, there is no subsequent separation of the fragments. The patella and tendon are essentially restored to the normal. The length of time required for recovery is much shorter after operation than by the other method of treatment.

I always feel that the patient should have the matter fully explained to him and should be made

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to take his choice. Treatment without operation is safe; it carries with it but little risk; the results are fairly good, but they are never perfect, and the period of disability is long. Treatment by operation carries with it some risk, but the successful results are ideal and the period of disability is much shorter. I feel that we should not operate on these patients unless we can do so with reasonable safety. Such operations should be performed only under the best of circumstances and where we are very sure we are not subjecting the patient to risk of infection. Otherwise it is best not to operate, for a live man with a stretched tendon is better than a dead man. We must also be sure that we shall secure properly functionating joints. Years ago I saw a series of cases, in nearly every one of which there was a more or less stiff joint. These cases were operated upon in the early days of antiseptic surgery, by drilling and wiring, and the results were far from ideal.

The operation that I perform is a combination of several methods. The patella is exposed by a long horse-shoe incision, with its convexity downward. I do not sew through the patella, but pass the suture above it, through the quadriceps tendon, then down the side of the patella to a point below it, then across the ligamentum patellæ to the opposite side, then up to the point of beginning. This suture is of No. 4 chromic catgut. It is all embedded, and you will see that it makes really a quadrilateral purse-string suture. When it is drawn tight and tied it brings the fragments in accurate apposition. Next the fibrous tissue is repaired by a proper suture, and the skin incision is closed with fine catgut or silk.

There is one particular I wish to call your attention to. Before operation we put a dummy dressing on the knee, then a plaster-of-Paris cast is applied. As soon as this cast is hard it is cut open and taken off, then it is ready for immediate use after the operation. This is much better than applying a plaster bandage with the patient under ether.

I do not believe in operating on these cases when they are first injured, but I think we should wait at least a week, keeping the joint immobilized and allowing the swelling and effusion to subside. This patient has been in the hospital more than a week and there is much less swelling than there was when he first came in. There is always a great deal of effusion of blood into the joint. This we remove by curetting and by picking out the clot with forceps, and we avoid manipulating and washing the joint as far as possible. Nothing should be allowed to touch the parts except sterilized instruments and sterilized gauze wipes.

Our results with this method have been very satisfactory or we would not have continued it. We have had no stiff joints, no case of infection, and no reason to regret operating. We take off the splint in the third week, allowing the patient to make active motion in bed, and soon the joint becomes flexible and mobile. We allow the patient to walk around any time after the fourth week.

Operation: I have made a horse-shoe shaped incision—the convexity well down below the insertion of the tendon—and now I have reflected the flap back. You see the laceration and the separation of the tendon and the capsular ligament. What you now see is the upper end of the lower fragment; the soft parts have dipped down between the two fragments, so that no contact can take place. I now curette the blood from the broken ends of the bones so that we can bring them accurately together. I had not manipulated this case to examine it before operation, but you see there are three fragments; there is a vertical fracture through the lower fragment. From the fact that this fracture is in three pieces, it would seem that the man had fallen on his knee after breaking the patella, and had fractured the patella by direct as well as by indirect violence. This case is complicated by the three pieces. If it were a single break it would have been easier to bring the fragments together. It would have been very difficult to have done this by the old method of wiring. I have introduced the purse-string suture as described above. This holds the fragments in good apposition. The rent in the capsule and tendon is closed by carefully applied interrupted sutures of chromic catgut. I am closing the skin with a continuous suture of very fine catgut, interrupting it occasionally, so that if required, we may take out a part of it without removing it all. In this case, I am placing a small rubber tissue drain under the flap on account of some oozing; it does not enter the joint. We very seldom use any drain in these cases. Having applied the dressing. we now put on the ready-made splint.

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Case 2. **Dislocation of External Semilunar Cartilage and Fracture of Patella Five Weeks Ago.** Abstract of history from the hospital records (Case No. 47,970): Otto S., aged 28, driver by occupation; admitted November 23. Family and past history, irrelevant.

Present History: One month before admission, while getting off a wagon, he slipped and struck the left knee against the curb-stone. He continued his work, but had severe pain in the left knee, and five days later, he came to the emergency dispensary and had it strapped. One week ago, he returned complaining of severe pain in the injured joint, which kept him awake at night. An x-ray picture was taken and the knee was immobilized in a cast.

Physical Examination: On admission, the knee was not swollen. Flexion and extension were painful and somewhat limited. On the external aspect of the joint there was a point of tenderness and crepitus, and it gave the impression of a displaced fragment. There was also tenderness at the lower end of the patella. The x-ray picture showed a fracture of the lower end of the patella; no displacement.

Remarks: You have heard the history of this case, which illustrates the second variety of fracture of the patella, *i. e.*, by direct violence. This patient fell on his knee when it was flexed. Though his patella was fractured, he was able to walk because the ligaments and capsule were not lacerated (by muscular action). It is the laceration of the quadriceps tendon that causes the disability.

This man walked to the hospital and was treated as an ambulant case, though he evidently should not have been. His knee was strapped and he was told to keep it quiet and apply cold compresses. Fortunately he did not complete the injury by tearing the ligament, and thus he had no separation of the patella fragments. The x-ray picture shows an excellent and remarkable result under the circumstances; his synovitis has subsided and his fracture is healed, but he has a dislocation of the external semilunar cartilage. He presents the classical symptoms of what is called internal derangement of the knee. He has locking of the joint and has had one or two attacks of consequent synovitis.

I shall open this joint, with the knee flexed, by a vertical incision over the movable cartilage and remove this. Suturing these cartilages has been abandoned. It has worked well in some cases, but not as a rule. There is apt to be trouble afterward from rolling up of the cartilage.

Operation: With the leg hanging over the table, fully flexed, a vertical incision is made over the mov-



Fig. 2. Patella fractured by direct violence, showing perfect apposition of fragments, though not immobilized and the condition practically untreated.

able cartilage. This gives only a fair exposure in this case. I do not recollect having operated upon any external cartilage before. The internal cartilage is the one usually in trouble, and, I think, it is much more satisfactorily exposed by this incision. If necessary one may make a transverse or some form of trap-door incision, but I think the vertical one is the best and that it should suffice. You see, I have been able to grasp the loosened cartilage, have severed it from its attachment along its posterior margin and have removed it. We will now straighten the leg and close the incision. As in the former case we have applied the ready-made splint. Unfortunately neither of these casts was a good one, the plaster having been poor, but still you can see what an advantage it is to have this ready-made splint.

To me it has been extremely interesting to see these two cases in one day, illustrating so perfectly the two varieties of fracture of the patella. The second was most remarkable in that the man made a perfect recovery in so far as his fractured patella was concerned, though walking around with what was certainly a very insufficient dressing.

Case 3. **Intestinal Stasis; Chronic Constipation. Prolapsing Hemorrhoids.** Abstract of history from the hospital records (Case No. 47,716): John T. F., aged 32, admitted November 9, 1914. Temperature and pulse normal; urine normal. Family history, negative. Past history, usual diseases of childhood; initial lesion and gonorrhea fourteen years ago.

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Present History: This dates back about six years, when hemorrhoids came out and could not be pushed back. He was treated for this with injections of carbolic acid for years, with some improvement. About five years ago part of the rectum became prolapsed; it could be pushed back, but would return. For the past few years the patient has complained of pain on the inner side of thighs, relieved by pushing the hemorrhoid masses into the rectum. Appetite fair; bowels very constipated; hemorrhoids bleed occasionally.

On admission he complained of vague pains in the abdomen, occasional dizzy spells, great difficulty in starting the stream in urinating, and slight burning.

Remarks: This patient's history was very unsatisfactory. He has been a sufferer for many years and is consequently neurasthenic. He doubtless exaggerates some symptoms and minimizes others. However, I think the salient points are as follows:

He has been constipated not only during the past few years, but from the time of his birth. He has always had slow and inefficient action from his bowels, and has required the assistance of enemas, cathartics, etc. I can get no history of appendicitis. When he first came to me he complained most of what he described as prolapse of the rectum. He had been treated for years by a quack, having injections of carbolic every week or two, instead of having a proper surgical operation. We have not been able to detect any prolapse of the rectum, but only a prolapsing mass of hemorrhoids. I tried to have an x-ray picture of his colon made, but the patient took fright and eloped from the hospital. He has returned again for operation, but we are still lacking that data. I shall open and explore the abdomen. I think we shall find that he has ptosis and kinks which account for his constipation. I am inclined to think that his hemorrhoids are secondary to his other condition—that they are produced and aggravated by prolonged constipation and straining.

Operation: I have opened the abdomen through a right rectus incision. The cecum is exposed; we find the appendix buried in a subcecal pouch, its apex lying to the outer side. The appendix is bent in hair-pin curve and the cecum is held down to the flank by the attachment of the mesentery to the peritoneal fold, which constitutes this subcecal pouch. This in itself is enough to account for his constipation, that is, this fixation of the cecum. About one and a half inches from the ileocecal valve, the ileum is markedly kinked by a band of peritoneum, which extends from the brim of the pelvis. This is a typical Lane's kink. The appendix is liberated, ligated

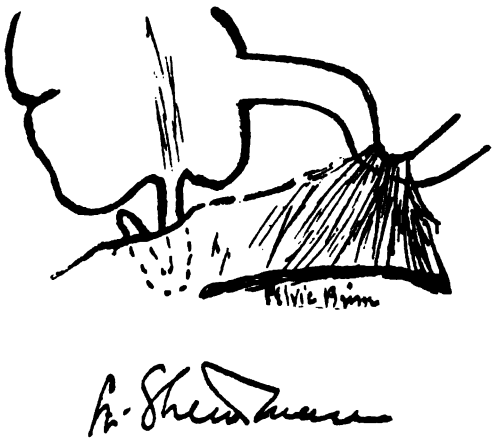


Fig. 3. Sketch showing appendix in subcecal pouch, and kinking of the ileum by peritoneal bands.

and removed with the cautery. The peritoneal band which kinks the ileum is divided between two ligatures. This procedure liberates the cecum and also does away with the fixation and kinking of the ileum. Thus far we have found two distinct lesions, either one of which might account for his constipation, but before closing the abdomen I shall search further and inspect the splenic flexure and the lower part of the colon. He has a long, lax colon, but I do not find any further abnormalities, except the general condition of ptosis. I believe that this operation will relieve him of his constipation and restore him to health. The abdomen is closed with our usual layer method and with some through and through sutures.

We will now operate on the hemorrhoids. During my entire connection with Lebanon Hospital, since 1895, I have employed the clamp and cautery operation for hemorrhoids with very few exceptions, and I have had no reason to regret it. We have operated on a vast number of patients, as many as ten in one day, and I recall but two deaths. One, a patient not operated on by myself, died of postoperative pneumonia, ten or twelve years ago. One of my patients died of cocain poisoning during the period of convalescence. There are some cases where we cannot safely give a general anesthetic, and where we may use some less radical method as a matter of necessity, but not as a matter of choice. I believe the clamp and cautery method to be the best of all. If properly performed and with proper after care, there should be a minimum of danger

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and a maximum of comfort and success as to cure. The important thing after the operation is to keep the hemorrhoidal region well within the sphincter by a properly made conical pad, held in place by a T-bandage. The important point in performing the operation is to *cut* the muco-cutaneous margin *and not crush it or burn it.* The clamp should be applied in the long axis of the rectum. Usually three segments should be removed. This will completely destroy the venous plexus, and relapse or recurrence is practically unknown after this operation.

Treatment of hemorrhoids by other methods is quite proper in some cases; for instance, where there is something about the patient or his condition which would render it unwise or unsafe to use a general anesthetic. Among these methods I have used with success the injection of carbolic acid, ligation and excision, and puncture with the electric cautery.

Operation: This patient has a relaxed sphincter. There are two prominent masses of hemorrhoids. I shall remove them by taking off two sections with the clamp and cautery, then if we can keep this area supported, so that it remains well within the sphincter, there will be no edema and no postoperative pain.

Case 4. **Pyonephrosis; Nephrectomy.** Abstract of history from the hospital records (Case No. 47,591): Wilbur H., aged 25; family history, negative.

Past History: Patient had diphtheria as a child. Six years ago he had attacks similar to the present one—pain in the right lumbar region, fever, cough, and he felt very sick. He was in bed for six weeks and lost 52 pounds. Two years ago, after injuring the left foot, patient developed a large abscess in the left groin which was incised. He has been perfectly well since.

Present History: Three days before admission patient began having severe pain in right lumbar region; had chills and felt feverish. The next day he vomited twice. He noticed a slight burning on urination; no frequency. The urine was redder than usual; bowels regular.

Physical Examination: On admission, patient had bulging in the upper right quadrant and side; marked tenderness. Liver, spleen and kidneys, not felt. Temperature, 103.6 degrees; pulse, 100. Blood examination: w. b. c., 15,800; polynuclears, 80 per cent. Urine showed traces of albumen, occasional w. b. c. and r. b. c., and hyaline casts.

Remarks: From the above abstract, which was taken from the patient's history, you will see that this young man came into the hospital about five weeks ago. At that time he was in a desperate condition; he had to have an immediate operation and it was not possible to take time for a satisfactory examination for the purpose of making an accurate diagnosis. The man was markedly septic; he had a large bulging mass, which appeared to be within the abdomen, and Dr. Bookman very properly performed a laparotomy, going through the right rectus muscle. This mass proved to be an abscess, and he opened and drained it. Undoubtedly he thereby saved the man's life. The incision into the abscess bled profusely and had to be packed with large tampons of gauze, for the purpose of checking the hemorrhage. After this packing could be removed the drainage was profuse, and it was not long before it was evident that urine was escaping with the pus. To make a long story short, this man had pyonephrosis with acute sepsis. He now has a large open sinus draining urine and pus through the original incision. As his kidney is worse than useless, I shall perform a nephrectomy; it will undoubtedly be a difficult operation under the circumstances.

Operation: The usual oblique incision is made, beginning just below the border of the twelfth rib. The opening through the lumbar facia exposes the perirenal fat. This fatty capsule is opened by a blunt dissection and the disorganized kidney is exposed. This kidney simply constitutes the wall of a large abscess. It is firmly adherent in every direction. It will be most difficult to separate it, and it will be impossible to deliver the kidney and to perform a nephrectomy in the usual manner. I shall tie off the ureter and divide it. I have clamped the renal vessels, double ligated them, and divided them between the ligatures. The kidney has to be removed by forcible blunt dissection and in several fragments. This is one of the most difficult nephrectomies I have ever performed, and yet it has been fairly satisfactorily accomplished. The entire kidney is out without much loss of blood and without much loss of time, and I think this man will make a rapid and satisfactory recovery.

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MANAGEMENT OF SURGICAL CASES BY THE GENERAL PRACTITIONER.*

By SOUTHGATE LEIGH, M.D., F.A.C.S., Norfolk, Virginia,

Surgeon in Charge, Sarah Leigh Hospital; Ex-President, Seaboard Medical Association, etc.

The few simple remarks that will follow are presented with the earnest desire that they may be, to some extent at least, for the mutual benefit of the surgeon, the general practitioner and the patient to be treated by them both. There is a large and increasing class of cases either sent or brought by the family physician to the surgeon for special treatment in his line, usually operative. The closer these doctors keep to each other the better for all concerned. The family physician often has intimate knowledge of the case that is of the utmost importance to the surgeon both in the diagnosis and in the treatment. It is, of course, always most satisfactory to the surgeon when the physician can accompany the patient. His assistance is invaluable; his presence is a great comfort and help to the patient, inspires more confidence on the part of the patient in the surgeon, and lessens to a great extent the fear that most persons have of surgical operations. If the physician cannot come it is most helpful if he will send a brief statement of the history, progress and previous treatment of the case.

It might be well here to digress for a few minutes and discuss briefly the separation of the two main branches of the profession. Public sentiment as well as professional opinion is rapidly bringing this about, as is exemplified in the recent formation of the American College of Surgeons, whose main objects seem to be the raising of the surgical standard and the education of the public to demand that none but trained surgeons be permitted to perform major operations.

It seems strange that we have been so slow in taking this step. In the past few years surgery has appeared to be most attractive to the medical man. Why, it is hard to say—possibly on account of the supposed greater remuneration. But this is not correct when one considers the additional cost of equipment, etc. Whatever the causes, the fact remains that too many have been rushing recklessly into surgery without the proper training and skill.

On the surface surgery seems to be much simpler than it really is. Witnessing surgical operations in a well regulated clinic gives one only a very slight idea of its extent and responsibility. While skill and training are indeed most essential to the proper performance of surgical procedures, yet in many cases the operation is itself only a small part of the successful management of the case. The doing of surgical work nowadays is a serious business. The responsibility is tremendous. With thorough handling before and afterwards, and with perfect technic, the progress of the case may be smooth and simple, and yet at any time disaster is liable to follow the slightest relaxation in management.

It is a pity that the field of internal medicine is so badly neglected. General practitioners who attempt surgery do so at the expense of thoroughness and development in medical lines. We need more medical specialists and fewer surgeons. Internal medicine offers much more inducement for effort and advance than surgery.

It is fortunate for us and our patients that opinion both in and out of the profession is rapidly changing. The time is not far distant when the lines will be more closely drawn. Then the general practitioner will do no surgery except minor work and emergency.

However widely separated in their work, the family physician and the surgeon must keep in close touch, each with the other, in the management of their joint cases. In diagnosis the aid of the former is invaluable, and in after-treatment without his help many of our best results may appear to be failures.

Surgical cases with doubtful diagnoses frequently require some time to be studied and investigated after arrival at the hospital. The majority of referred cases, however, may be operated on with but little delay if their general condition has been looked into and improved before leaving home. This includes the proper use of cathartics, an abundance of pure water, strict dieting and cleansing of the mouth. Abdominal cases do best when given only liquid diet the day before operation, and all patients requiring an inhalation anesthetic should take nothing into the stomach on the day of the operation. The judicious use of tonics is often helpful, as is also the strict treatment of cases with high blood-pressure.

The use of cathartics in appendicitis and the other acute abdominal conditions is to be condemned.

* Read before the Seaboard Medical Association at Goldsboro, N. C., December, 1914.

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These patients should receive no food by the mouth, should have the head of the bed elevated, and in appendicitis should be kept on the right side. They should also be transported in the same position. The reason is obvious and is frequently demonstrated at operation. The bowels may be moved cautiously by enema, and both water and nourishment given the same way, if indicated. Cases of prostatic enlargement may be much helped by preliminary home treatment and their stay in the hospital considerably shortened. Such treatment consists in the general regulations as mentioned before, together with sitz baths, clean catheterizing and bladder washing.

Compound fractures might also be mentioned. The wound should not be touched by the hands or anything else that has not been sterilized by heat. The surrounding skin is painted to the edge of the wound with tincture of iodine, and the wound washed out with 1 to 1,000 bichloride, followed by sterile salt solution. Sterile gauze is then put in or on the wound, and the limb is splinted for transportation. If there is hemorrhage it should of course be stopped, but every antiseptic precaution must be taken and the wound, if possible, be touched only by sterilized instruments and sponges.

The physician can do much towards preparing emergency cases, and save considerable time after arrival at the hospital. He should always warn the patient against the taking of food.

Notifying the hospital as to the kind of case and whether ambulance or other vehicle is needed is very helpful.

As before stated, the presence of the family physician at the operation is of great assistance and often adds materially to the successful outcome. Nothing is more pleasing to the surgeon than his presence, advice and assistance.

On account of improvement in anesthesia and technic, wound healing is more positive and rapid in the past few years, and the length of the stay in the hospital in clean cases has been greatly reduced. The patients have so much easier a time nowadays and feel so well, that the tendency is for them to leave the hospital even earlier than is best.

Here again the surgeon is in great need of the assistance of the family physician, who should see the patient promptly on arrival home and have entire charge of the case until complete restoration of strength and health. However careful the surgeon may be in writing the home doctor about the case, and however strongly he may impress upon the patient the necessity of remaining under the physician's close care and watch for some time, yet it is hard to get people to do as they should in this respect. They think that as soon as they leave the hospital, however early, they should be completely and permanently cured and able to do as they please. Such action on the part of patients causes the surgeon untold worry and only too often spoils good results.

These cases must have strict care after reaching home. They should drink plenty of water, eat simple food, and avoid over-exertion and exposure. Most of them need cathartics and tonics and should be advised from time to time what to do and what not to do.

After abdominal operations patients should be careful not to strain a fresh scar by over-exertion or coughing, and drainage cases must be on the watch to prevent obstruction, by care in diet and the judicious use of cathartics.

Most persons during the postoperative stage eat too much and suffer from digestive disturbances in consequence. Asafetida is often helpful in these cases and also in nervous complications.

Rectal cases need mild cathartics and sitz baths until entirely healed, and longer.

Prostatic cases often require bladder washing from time to time as indicated by the condition of the urine.

Patients who after operation have more or less stiffness of muscles or joints should receive massage or Faradism persistently until completely relieved.

The removal of sutures or uterine stems must be looked after carefully.

Binders are frequently necessary in postoperative abdominal cases, the period of use depending on the nature of the case.

The laced front corset which is made to fit and be supported by the back and hips is invaluable in all women with weak pelvic outlets or a tendency to uterine displacement. Properly used it lifts rather than depresses the abdomen.

And so we might go on indefinitely describing the various details in the preparatory and after-treatment of operative cases. This is hardly necessary. The principles being understood, the details will,

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with the aid of that all-essential element, "Common Sense," easily be worked out.

The problems are to get the patient before operation in as good condition as time will permit, and after its performance to continue to look after him as strictly as may be necessary until he has received and enjoys to the fullest all the good effects that surgery can furnish him.

Just as the physician should and does strengthen the confidence and trust of the patient in the surgeon's work and skill, so also to the same degree must the surgeon impress upon the patient the importance of the part taken by the family doctor in the preparatory and after-treatment. By the working together, thus in complete harmony, of all three parties most concerned, will our final results be greatly augmented and perfected.

REPORT OF A CASE OF ABDOMINAL PREGNANCY.

By G. E. BENNINGHOFF, M.D., Bradford, Pa.

Cases of abdominal pregnancy have either become so frequent that they are not reported, or the physician discovers them so early, that they are operated upon before they become interesting, as they do when the pregnancy continues to term and



Fig. 1. 1. Head. 2. Face. 3. Buttocks. 4. Cord. 5. Placenta. 6. Omentum. Anterior view.

the fetus and placenta remain as an abdominal tumor. Be that as it may, we see very few reported cases of prolonged abdominal pregnancy at the present time.

The interesting features of this case are due to two facts: first, the neglect of getting the subjective history of the patient, and, second, the failure to make a diagnosis of the condition before operation, which was done, not for abdominal pregnancy,

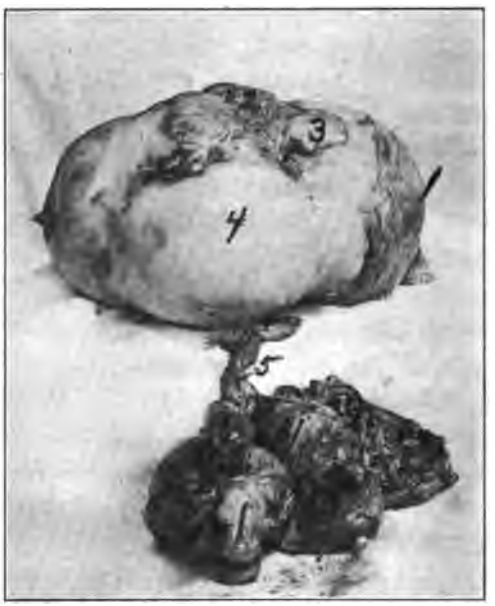


Fig. 2. 1. Head. 2. Left leg and foot. 3. Left hand. 4. Back. 5. Cord. 6. Placenta. Posterior view.

but for a uterine subserous fibroid tumor. I do not hesitate to state that it was neglect on my part not to obtain this patient's subjective history, yet while I frankly admit it, I suspect that almost any surgeon who is doing abdominal surgery would have done as I did under the circumstances.

Here was a woman of spare build with thin abdominal walls, unable to speak English, who in her loosely fitting garments presented a tumor so large that one could see it before she uncovered the abdomen. The hand could grasp it and displace it in every direction, but without pain. Whatever it was, it was producing pressure symptoms, especially when the patient was in an upright position, and of course it should be removed. She stated to the friend who accompanied her, that the tumor had been there about three years, but did not produce any inconvenience until during the last three months. There had been no hemorrhage; menstruation was regular, not painful; she was the mother of five children.

This was July 1, 1914. I was leaving the city for a time and therefore advised her to return to the Bradford Hospital the first of August, which she did. I operated on her August 4, 1914.

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The usual median section through linea alba was made, except that the left rectus was separated and the peritoneum divided beneath the muscle to insure permanent union of the wound, fearing the possibility of postoperative hernia because of the



Fig. 3. Sac removed, limbs straightened. Saponaceous material shown about entire body.

extensive relaxation of the entire abdominal wall.

The tumor was easily raised out of the cavity, when it was seen to be covered entirely by omental bands, together with the transverse colon and several coils of the ileum. The adhesions were not very firm and most of them were sponged off; others were tied off and divided. After this was accomplished we had an irregular formed tumor about 5 by 8 inches in diameter and weighing 4½ pounds. Attached to the middle of the long axis was a long pedicle which passed down to beneath the left broad ligament. After close examination of the pedicle I mistrusted for the first time that I was dealing with an extra-uterine pregnancy and that the supposed pedicle was the umbilical cord, which it was, although it was rolled up in omental-like tissue which extended down its entire length. This was divided near the fetus which was laid aside. By following down the cord the placenta was easily located beneath and in the folds of the left broad ligament. While it was quite thoroughly covered over with exudative tissue, yet it was quite as easily removed *in toto* as are buried pus tubes. It weighed 4½ ounces. The fetus was completely enveloped in a sac, and one had to inspect it quite closely to recognize it as such, or rather as a fetal sac. It was not a lithopedion, but surrounding the fetus and within the sac was the so-called adipocere formation.

The accompanying photographs show nicely the appearance of the sac (anterior and posterior views) as well as the fetus, and, after the sac has been removed, the cord and placenta.

The patient had an uneventful recovery, and before leaving the hospital, through an interpreter, gave the following history: She missed her menstrual period in June, 1911, and did not menstruate again for nine months, or until March, 1912, when she expected to be confined and had made all preparations for a baby, which would have been the sixth one. March 14th, she had severe pains for two hours, which subsided. The pain was in every way like that of former labors, but not continued. She menstruated the following month, April, 1912, and continued regularly after up to the time of operation.

While this history is not absolutely typical of extra-uterine or abdominal pregnancy, it was characteristic enough that one would have diagnosticated the condition readily enough had the complete history been taken.

SOUTHERN SURGICAL AND GYNECOLOGICAL ASSOCIATION.

Twenty-seventh Annual Session, Dec. 16, 1914. Authors' Abstracts of Papers.

UTERINE PROLAPSE.

By C. H. MAYO, M.D., Rochester, Minn.

With retroversion and descent, difficult to replace because of probable associated pelvic lesions or other abdominal complaint, the true condition of which had best be known, an intra-abdominal operation should be made on the round ligaments. If, as rarely occurs, the cervix remains too far forward, the uterosacral ligaments should also be shortened to effectively bring the uterus to anteversion.

The interposition type of operation is efficient in the relief of uterine prolapse associated with extensive cystocele. The best results are secured in women having a firm uterus which usually means an age limit within the forties. This operation re-

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lieves cystocele and descent or the first and second degrees of prolapse. In the third or fourth degrees of complete prolapse in women in the fifties, with a soft degenerating uterus undergoing rapid atrophy, and in whom the position of the ligaments in anteversion still permits the uterus to be brought out of the body, the operation will undoubtedly fail of relief and another method should be substituted.

The modified Kocher operation is occasionally done upon women in the forties—in which case the tubes are divided—but is usually reserved for women well past the change of life with atrophied uteri. For a large group of cases, or the third and fourth degrees of prolapse in patients between 45 and 65 years of age, often with atrophy of the uterus and distention of the vaginal outlet, neither the interposition nor the Kocher types of operation are indicated. In these cases the following is an effectual method of securing relief:

The cervix is grasped with two pairs of cerebellum forceps and drawn well out of the vagina. A pear-shaped incision is now made with its apex one and one-half inches below the external urinary meatus. It passes down each side of the cystocele and around the cervix. The sides of the incision are grasped and the vaginal wall readily separated from the bladder by blunt gauze dissection. The apex of the vaginal flap attached to the anterior lip of the cervix is turned down and the bladder rapidly separated by gauze dissection from the front of the uterus. As soon as the peritoneal fold is reached it is incised and divided laterally. The blunt gauze dissection separates the posterior vaginal wall from the uterus at the side and on to the broad ligaments. The sharp fork retractors are now used to draw the fundus of the uterus out of the incision as in an ordinary hysterectomy, and the cervix is restored within the vagina. The broad ligaments are fully spread out on each side. Unless the ovaries are diseased they are not removed. A heavy hysterectomy forceps with long blades now grasps each broad ligament. The uterus is divided a half inch from the forceps and two more pairs are applied, one on each side, with their tip catching the cul-de-sac behind the cervix. The uterus is then cut entirely away.

If there is any tendency of the sigmoid or omentum to prolapse, it is held back by a long pad of gauze inserted into the peritoneal opening. The pairs of forceps, two on each side, are now approximated laterally, and a running mattress suture of chromic catgut is applied which passes back and forth behind the forceps completely through both ligaments at such a distance as to tighten the broad ligaments. From one and one-quarter inches to one and one-half inches approximation of these ligaments is secured. The method of suture is applied so as to interlock and prevent the inward slipping of any vessels. When the suturing reaches the round ligament side it is caught into the flap anteriorly where the bladder has been separated from the anterior vaginal wall. This suturing extends backward on each side from this point catching into the broad ligaments, and then on each side into the angle of the depth of the dissection, thus compelling the bladder to rest on the broad ligaments. The loose ends of the exposed broad ligament are now approximated by a running buttonhole stitch extending back to the perineal position and the sides of the vaginal mucosal flaps, and closed by a running catgut suture up and back in a submucous manner. No sutures are exposed.

Goiter in Children.—Dr. C. G. Buford (*Surg., Gyn. and Obst.*, January, 1915) states that simple goiter is of frequent occurrence among children in Chicago and is associated with a definite symptom-complex. The disease is most common in places where certain waters are used for drinking purposes, especially those containing sewage. The bacteria or their chemical products present in such water probably constitute the chief cause of goiter. Local infections, particularly those of the tonsils, adenoids, and teeth of children, may supply the excess of bacteria ingested, and produce goiter singly or in conjunction with the water supply. As regards treatment the author has found iodine is any form beneficial, but prefers desiccated thyroid extract (Armour's). The child must be fed enough just to produce the slightest signs of hyperthyroidism. The feeding must be kept up daily for months or years according to the results obtained. Frequent interruptions in the treatment are thought to invite glandular hyperplasia. The less the encapsulation the more satisfactory the results.

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Editorial Department

NEW YORK, FEBRUARY, 1915

SOME CANCER FALLACIES.

Despite the tremendous activity displayed in the study of cancer in the last two decades its essential cause remains as great a mystery as ever. However discouraging this may appear at first sight, substantial progress has been made in the investigation of the predisposing causes, and certain popular beliefs which have long created alarm among the timid have been shown to be fallacious. There is not a shadow of a doubt that chronic irritation is the most prominent predisposing factor of malignant disease, and the recognition of this is of the utmost significance from a prophylactic viewpoint. It has been demonstrated that benign growths, such as warts, moles and nevi when subjected to constant irritation may become starting points for cancer; and there would seem to be a more or less close etiological connection betweeen chronic gastric ulcer and cancer of the stomach, gallstones and cancer of the liver and pancreas, cervical tears and uterine cancer, syphilitic lesions and cancer of the tongue, chronic mastitis and cancer of the breast—to mention only a few instances of so-called precancerous conditions. As to the influence of heredity, diet, soil, climate, race, occupation, etc., there is still considerable difference of opinion. A thorough consideration of this subject based upon careful statistical studies is to be found in a recent work entitled "The Cancer Problem," by Dr. William Seaman Bainbridge—a most interesting book which is worthy of a place in the library of every physician and surgeon. Dr. Bainbridge tells us that "heredity has been shown to play a rôle, but not one to cause anxiety"—a statement that should allay the widespread fear among those in whose families there have been deaths from malignant disease. Concerning diet it is stated: "Hardly an article of food has escaped condemnation. Salt, tomatoes, coffee, meat—especially frozen or chilled meat—pork, and alcohol, all come under the ban. But the possible influence of diet is shown not to be very great by the liability to cancer of vegetarian castes in India, and of the rice, or rice and fish-eating Japanese. Cows never eat meat, and although both tame and wild mice are occasionally cannibalistic in their habits, they do not come in contact with pork, tomatoes or alcohol. Neither do cows or other herbivorous animals liable to cancer eat their vegetable

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food cooked. Therefore it seems that such sweeping views on diet as are published from time to time in lay papers are calculated to do a lot of harm." Careful investigations disprove the claims that the disease is much more prevalent in temperate than in hot or cold climates, in low-lying districts than in elevated places, among civilized people than among savages, and that certain races are completely immune. That there is a relative racial immunity is quite probable, but whether this is dependent upon environment, and especially upon habits of life, remains a mooted question. According to Dr. Bainbridge, "the supposed freedom of savage and semi-civilized races is accounted for, at any rate in part, by the relatively small number of these individuals who have been examined, by age incidence, and by other factors not concerned with geographical and ethnological questions." The influence of occupation in the causation of cancer is especially well illustrated in the case of workers in tar, soot, petroleum and anilin, but here also we have to deal with but another phase of chronic irritation. Some authors—particularly those who uphold the parasitic theory and who consider cancer a "filth disease"—have placed much stress upon overcrowding as a source for its dissemination, but this view is not supported by accurate statistics; thus in London it was found that there was more cancer in the least densely populated areas. Other popular fallacies that have served to alarm the nervous, such as the alleged existence of "cancer houses," the communication of the disease by contact, the necessity of adopting special precautions to avoid its transmission other than those dictated by cleanliness, have been dispelled by careful and unbiased statistical investigations. The question whether cancer is on the increase has been the subject of much controversy, and we cannot do better than cite Dr. Bainbridge's conclusions as eminently fair and judicious: "There has been a great increase in the *total* number of deaths recorded from cancer, partly due to improved certification of causes of death and improved diagnosis, and also because more people nowadays attain to ripe years. This must not be confounded with the question of *relative increase*. When the figures are analyzed it is shown that there has been no relative increase for some parts of the body, for example, skin, uterus, ovary, liver, but that for other sites, notably stomach and intestines, breast and tongue, there has been a relative increase. The question whether this relative increase is real or only apparent has not been decided. There is some probability that a good deal of the increase for the stomach and intestines may be explained by improved diagnosis and certification of causes of death, owing to improved methods of surgical diagnosis, but for the tongue and breast this would hardly hold. In the case of the breast, the increase in the inability of women to suckle their children calls for investigation."

Correspondence

Editor INTERNATIONAL JOURNAL OF SURGERY:

I desire to get in touch with physicians interested in the care and treatment of the aged, as well as those interested in research work dealing with senescence, for the purpose of forming a geriatric society.

I. L. NASCHER, M.D.,
103 West 88th Street.

February 1, 1915.

Editor INTERNATIONAL JOURNAL OF SURGERY:

Dear Sir:

In connection with a sensational report of an operation under the so-called "twilight sleep," there has appeared in various newspapers a statement purporting to be by myself which would imply, not only that I was present at the operation, but that I unequivocally endorsed the method. The following appeared in the New York *World*, January 28, 1915:

"After this demonstration," Dr. G. Frank Lydston said, "twilight sleep for men will become common. The use of this anesthetic will no longer be limited to childbirth cases, but both women and men will benefit by it generally.

"This operation was important, and I am glad to express my professional opinion that it was completely successful."

I desire to state, 1st, that I was not present at the aforesaid operation; 2nd, I never have been interviewed upon the subject nor, up to the present moment, have I expressed for publication any opinion of the so-called "twilight sleep;" 3rd, my present attitude toward the revival and sensational nomenclature of the employment of scopolamine-morphine hardly would comport with the sentiments expressed in the statement falsely attributed to me.

Very truly,

G. FRANK LYDSTON.

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Department of Railway Surgery
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INJURIES TO THE ELBOW.*

By W. W. HARPER, M.D., Selma, Ala.

I realize that much that I shall say in regard to this subject will not be new to most of you, but it is often beneficial to review and say over and over again the things that we know, "lest we forget."

There is probably no joint in the body that is of more importance than the elbow. It is the joint of gesture, the joint of salutation, the joint with which we seal our friendships, the joint with which we feed ourselves, the joint which enters into all the activities of life. Some woman has aptly said that the way to a man's heart is through his mouth, and if you wish to keep your husband's heart, "you must feed the beast"—and that is difficult with a stiff elbow.

The first thing we will consider is injury to the soft parts, and there are a few important points to be emphasized. Formerly it was taught that the free use of water and soap was necessary for the well-being of wounds. We have, however, passed over this period and no longer use this method for cleansing. For the past year I have discontinued its use. Where there is much soiling with grease, I simply mop it off with gasoline, and then apply to the wound and surrounding area a three per cent. tincture of iodine. In using gasoline be sure that it all has evaporated before the dressing is applied. I once prepared a patient for laparotomy by cleansing the surface with gasoline, and some of it ran down the arm and was covered by a sheet. The next morning there was a blister of the forearm. Gasoline, like ether and chloroform, will blister if not allowed to evaporate. If water is used preparatory to the application of iodine, the value of the latter is destroyed, as the water causes edema of the cells and prevents the iodine from penetrating the tissues. With the intelligent use of iodine you will seldom have an infection.

Where there is so much damage to the soft parts as to require drainage, avoid the flexure of the joint and the region of the ulnar nerve. Otherwise the resulting scar may produce disability from contraction, and if the drainage tube lie against the ulnar nerve a neuritis may develop.

We will say that the patient has sustained an extensive injury to the soft parts—the muscles are torn and exposed. Having provided drainage, let me urge you to endeavor as far as possible to get normal tissue over the olecranon. This is one of the most important objects to be obtained in treating injuries at the elbow. Unless skin with its subcutaneous tissue can be drawn over the olecranon process, the patient after his recovery will have difficulty in bending the elbow.

If there is much swelling I advise that the part be liberally covered with gauze and cotton and this dressing be kept wet with a hot solution of sodium citrate 1 per cent. and sodium chloride 4 per cent. The citrate prevents coagulation in the mouths of the lymphatics and the chloride creates a free osmosis into the dressing.

The surgeon should remember the three nerves at the elbow, the median, ulnar and musculo-spiral. The fourth and fifth fingers do not receive their motor supply from the ulnar, and the patient thinks that all is well because he can work his fingers. You will remember that the ulnar supplies the fourth and fifth fingers with sensation and the hand muscles with motion, and when this nerve is severed there is very rapid wasting of the hand. The musculo-spiral descends to the outer side of the arm between the triceps and the supinator longus, and when it is severed there is the typical wrist-drop. When the median nerve is cut the patient is unable to flex his fingers and has loss of sensation. Having determined that the nerve has been severed, carefully search for the ends and suture them together with fine silk. Bring axis cylinder to axis cylinder by suturing together the nerve sheaths. Do not pass the suture through the axis cylinder, as this will destroy the function of the nerve.

All fractures of the elbow, except that of the olecranon process, should be treated by actually flexing the forearm upon the arm. I consider this form of treatment one of the great advances in surgery, and for its use we are indebted to Mr. Robert Jones of Liverpool. In fracture of the external condyle, if the elbow be placed at an angle of 90 to 180 degrees, which was the old form of treatment, the extensors and supinators which are attached to the external condyle pull it downward and the patient recovers with a permanent disabil-

*Read at nineteenth annual meeting of Association of Surgeons of Southern Railway, Washington, D. C., June 18, 1914.

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ity. The flexors and pronators, being attached to the internal condyle, will, in a fracture, pull it down when the forearm is extended. This x-ray picture shows the elbow of a doctor who was thrown from his buggy and sustained a fracture of the elbow. The doctor was opposed to having it treated in acute flexion, and he was converted only when a radiograph taken with his elbow extended showed both condyles displaced downwards an inch. This displacement is well shown in the skiagraph. To leave the broken bones in this position means a cripple for life.

By recalling your anatomy, you will readily appreciate the importance of treating elbow fractures in acute flexion. The triceps arises from the upper part of the humerus, and the tendon is attached to the olecranon process; the tendon thus acts as an ideal posterior splint, preventing any backward displacement of a broken fragment. Being placed between the condyles it acts as intercondyloid splint and prevents lateral displacement when the elbow is acutely flexed.

Dr. Lemon here exhibited a boy and commented as follows: "This boy on the 28th of April sustained a T-shaped fracture of the humerus extending into the elbow-joint. The skiagraph, which I show you, reveals the great displacement. This fracture was treated in acute flexion as described by Dr. Harper, and the boy was off duty only one month, and ever since has been at his work."

Dr. Harper: The limited motion in this boy's elbow is not from any lesion within the joint itself —the patient's joint is perfect. If the stiffness were from intra-articular adhesions there would be no motion in the joint. In such a joint it is useless to break up the adhesions under anesthesia as they reform stronger than ever. It is extremely important to differentiate between extra- and intra-articular adhesions. In intra-articular adhesions motion in the joint is lost, while in the extra-articular type there is limited movement. You will notice that this boy of Dr. Lemon can move his arm to a limited extent, and this very fact proves positively that the lesion is extra-articular. By practicing passive motion and urging the patient to use his arm, he will gradually obtain free use of his elbow.

Just here, I wish to call attention to bursitis simulating joint inflammation. Do not forget that wherever the large tendons pass over a joint and are in contact with it, nature interposes a bursa; and many of these supposed joint inflammations are simply inflamed bursæ. Recently I saw such a case in consultation. The patient had a rigid shoulder and every movement was painful. At once we thought of a deltoid bursitis. By gently lifting the arm and thus relaxing the deltoid muscle, we were able to move the shoulder-joint without pain or muscle spasm. This made it absolutely certain that the inflammation was in the deltoid bursa and not within the joint itself. The tendon of the biceps passes in front of the elbow to be attached to the head of the radius. Beneath this tendon is the biceps bursa, and when it becomes inflamed, the patient presents all the symptoms of a synovitis of the elbow. Relax the biceps muscle, and if the elbow



can be worked without muscle spasm and pain the trouble is in the bursa.

The following case illustrates the saying that we learn more from our mistakes than we do from our successes: The case was that of a negro woman who sustained a transverse fracture of the humerus. So far as the fracture is concerned the result is perfect, but she has a stiff elbow following fibrosis of the muscles in this region. This fibrosis was caused by my bandage being too tight. It was not tight enough to produce the classical symptoms of interfered circulation, but it was sufficiently snug to impair the circulation through the muscles, and the usefulness of the arm will be impeded for some time. I warn you against this danger.

In fracture of the olecranon process, the elbow should be placed in full extension. Recently there was under my care a yard clerk who had been run over by a train. The ball of the wheel in passing over the elbow evidently squeezed it from the rail.

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The skin was torn from the muscles for several inches above and below the elbow. The muscles were badly lacerated and contused, and the olecranon process was broken off and turned back, exposing the joint. After painting the soft parts with iodine, I coaptated as well as possible the torn muscles and skin and applied a Lane plate to the broken olecranon. I told the family that I felt sure that the elbow would be stiff. There was considerable sloughing and the wound had to be dressed every day, but through the diligent use of the iodine technic we were able to avoid infection, and I am glad to tell you that the boy has a perfect elbow. From the skiagraph you will notice above the olecranon a bony deposit. This was due to the fact that the periosteum was torn and peeled from the



bone, and osteo-blastic cells wandering out into the tissues formed new bone. The skiagraph shows the Lane plate in position.

Note. July 31, 1914: As the plate was causing irritation, it was removed. The wound promptly healed and the boy is at work.

One note of caution I wish to sound in the employment of the Lane plate: Do not use it in the presence of suppuration, or you will lose a limb or the patient. I do not advocate the Lane plate in all fractures, but in those where it is impossible to hold in accurate apposition the broken ends, I think it is the ideal treatment. You must, however, be absolutely aseptic in your technic. Last summer at the London Hospital for Sick Children I saw Mr. Lane apply his plate to a six-day-old baby for an obstetrical fracture of the femur. By his side was a pan of boiling water, and no instrument ever touched the wound a second time until it had passed through the boiling water. Not even did his gloved hand touch the wound. This perfect asepsis is the secret of his success. I have a man with a Lane plate who has been working for two years. He sustained a compound fracture of his tibia, and no one can tell from his walk which leg was broken. I have another case, a fracture of the humerus, to which a plate was applied over a year ago. The plate is still *in situ* and the man has a perfect arm.

What shall we do with stiff elbows from intra-articular adhesions? Either excise the joint and establish a flail joint, or interpose fascia and muscle between the articulating surfaces. Dissect back a tongue of fascia and a layer of muscle from the triceps, separate the fibers of the triceps, and through this opening pass the tongue of muscle and fascia and place it between the head of the humerus and the ulnar. As a rule there is sufficient blood supply to take care of the flap and in a certain percentage of cases you secure a movable joint. You cannot mobilize the joint by breaking up the adhesions under anesthesia, for the adhesions will reform stronger than ever.

The question arises: When shall we begin passive motion in fractures near the joint? Some one has answered: "When tenderness has disappeared." In beginning passive motion, exercise the greatest gentleness—make one movement and rest until the next day. If you do too much at one sitting you will cause a severe reaction and defeat your purpose.

TRAUMATIC SHOCK—HOW SHALL WE MEET IT.*

By W. H. TAYLOR, M.D., Newmarket, Tenn.

You are rushed to see a man who has had a foot or a hand, a leg or an arm crushed or torn away, under a moving train of cars. The call may be to an engineer or fireman who has had a scald from escaping steam, or has had a large area of the integuments of the limbs destroyed, exposing extensive peripheral nerve supply; or the case may be a crushing injury involving large nerve trunks, extensive laceration or contusion of the abdominal viscera. In either case the man has sustained a shock.

The picture is complete from the first. The patient is helpless; his features pinched and face shrunken; a cold clammy sweat exudes from his skin; his lips are bloodless; his fingers and nails are blue; the pulse well nigh imperceptible, threadlike and flickering, not infrequently irregular and intermittent, often dropping to fifty or

* Read at nineteenth annual meeting of Association of Surgeons of Southern Railway, Washington, D. C., June 18, 1914.

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fewer beats to the minute. The thermometer in the rectum registers as low as 96 or 97. Respirations are irregular, sometimes deep and sighing, at other times shallow and superficial, often scarcely perceptible. The patient complains, if he complains at all, of chilliness, sometimes coldness. The special senses are usually intact, but may be dulled. The sphincters are usually undisturbed. Though there is no paralysis, the patient is apathetic and disinclined to make muscular effort, allowing himself without resistance or objection to be handled or placed in any position. Nausea, vomiting and hiccough are often prominent, and, when excessive, of bad omen. The above comprise many of the classical symptoms of "shock" which are often modified in intensity by temperament, environment, location and extent of injury, race and idiosyncrasy, which I will not here discuss.

What is shock? Pirogoff says shock is traumatic torpor or wound torpor. Savory defines it as a paralyzing influence on the action of the heart, due to a sudden and severe injury of the nerves. Jordan describes it as a condition of the animal organism marked by arrest of all functions, caused by severe influence upon the central organs or a considerable portion of the peripheral distribution of the nervous system. Fischer says of it: "Shock results from weakness of the heart's action caused by reflex vasomotor paralysis, whereby the large abdominal vessels are engorged with blood, the surface, brain, heart and other organs are correspondingly ischemic." Blumm speaks of shock as an arrest of the heart's action due to reflex irritation of the pneumogastric nerve. Stephenson says of it: "Shock is prostration or collapse, which sets in almost immediately on receipt of an injury of sufficient intensity to inhibit the action of the vasomotor nerves." In the opinion of Mapother, the condition is due to a spasmodic contraction of the minute arterioles due to vasomotor influence, this being proven, he thinks, by the weakened heart, contracted arterioles, lowered temperature and pale and shrunken skin. DaCosta says: "Shock is a depression of the vital forces arising from an injury or a profound emotion acting on the nerve centers." He adds that no theory of shock is entirely satisfactory.

The two leading theories of shock are based on certain functional disturbances in the vasomotor and nervous systems respectively. Fischer contends that shock produces a paralyzing effect on the heart in a manner similar to that produced on the frog in Goltz's experiment, which consists in striking repeated blows upon its abdomen. When the heart begins to pulsate again it remains small and pale, receiving very little blood in the diastole, and is therefore able to throw very little to the system. This condition was believed by Goltz to be due to lack of tonicity of the bloodvessels of the abdominal cavity, but later he was convinced that there was a general vasomotor paralysis. He demonstrated that the same condition could be produced by the infliction of blows upon other parts of the body. It afterwards was shown that this same lack of tonicity was not restricted to the arteries, but existed in the veins as well. Fischer, therefore, is of the opinion that a great mass of blood stagnates, or reaches a condition of stasis, in the abdominal veins and arteries during shock. This, he thinks, explains the symptoms of shock—the anemic skin, pale, cold and without sensation. Experiment has shown that muscles deprived of blood are weak, rigid and incapable of function; hence the irregular and interrupted heart's action, accounting for the small, thread-like or absent pulse; the anemia of the brain, explaining the phenomena of nausea and vomiting.

Snider also adopts the theory of reflex paralysis of the vasomotor nerves, teaching that every extreme irritation, whether produced by extensive burns or surgical operation, causes at first contraction and subsequently dilatation; the heart being unable to force the small amount of blood through the empty vessels, its own muscles being insufficiently supplied with oxygen, it gradually ceases to beat. The great lowering of the body temperature is explained by the diminished blood-pressure. Fischer extends the theory of vasomotor paralysis so as to apply to the whole vascular system. Gross held that shock is essentially dependent upon reflex paralysis of the entire circulatory system, but especially of the heart and abdominal vessels. Boise does not believe in the theory that shock results from vasomotor paralysis. He explains shock by assuming a hyperirritation of the entire sympathetic system, and

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as a result, stimulation of the vasomotors, contraction of the arterioles, and a spasmodic action of the heart. But let us pursue this branch of the subject no further.

The degree of shock is not always proportioned to the severity of the trauma. Slight injuries in persons predisposed to shock give rise to dangerous symptoms; while grave injuries are not infrequently attended by a mild degree of shock. Generally speaking, the lower the scale of development of the nervous system the greater the resistance to injuries of all kinds. In man the condition or type of the nervous system constitutes an important factor in determining the degree of shock. A high-strung, irritable, nervous temperament, as also a sedentary occupation and mental strain predisposes to it. Debilitating diseases, worry of the mind, narcotic and alcoholic addictions have a similar tendency. On the other hand, outdoor life, wholesome plain diet, invigorating exercises, abstemious or temperate habits tend to diminish shock. There can be no doubt as to the bearing or influence of nationality in relation to this subject. The North American Indian and negro are far less susceptible to shock than the descendants of European nations.

Crushing injuries of the extremities caused by railway accidents and machinery furnish the largest percentage of grave cases of shock. Concussions and contusions of the chest, abdomen and testicles, and fractures, dislocation and contusions of fingers are always followed by more or less of it. "Crushing injuries involving large nerve trunks are known," says Senn, "to give rise to the various forms of shock." The same authority observes that wounds of the lower extremities produce greater shock than do similar wounds of the upper extremities, and, as a rule, it is greater the nearer the injury is to the trunk. All capital operations, especially those involving considerable time, are attended by marked shock, this was particularly shown in hip-joint amputation as done by the fathers, this operation having been prohibited by the Surgeon-General during the Civil War on account of the fatal shock attending it. The evulsion of an arm or leg is also attended by grave shock, as also are blows upon the epigastrium and upon the neck, as well as severe burns, especially where great areas of skin are destroyed, these proving fatal in most cases where more than one-third of the integument has been involved.

The degree of shock is strongly indicated by the temperature, to determine which the thermometer should be placed in the rectum, where it often registers as low as 96 or 97. Very much lower registrations have been noted when taken in the mouth or axilla. Ordinarily the lower the temperature the graver the outlook, 2 degrees subnormal, as shown in the rectum, affording a most unfavorable prognosis. Only in the gravest form of hemorrhage can the patient's condition be mistaken for shock, the depression here being syncope or fainting. Anemia from loss of blood comes on gradually, save in case of wounds of large vessels or several smaller ones, where collapse is more sudden and more nearly resembles shock. Bell gives a striking picture of such a case: "The face all at once becomes deadly pale, the circle around the eyes livid, the lips are black, the extremities cold, the patient faints, recovers and faints again, with a low quivering pulse; he has nausea, his voice disappears, there is an anxious, incessant tossing of the arms, with restlessness, which is the most fatal sign. He tosses continually from side to side, his head falls down in the bed, at times he suddenly raises himself in the bed, gasping for breath with inexpressible anxiety. The tossing of his limbs continues, he draws long and convulsive sighs, the pulse flutters and intermits with the breathing more and more, and he expires." The prominent features of hemorrhage are anxious expression of face, tossing of arms, great restlessness, and frequent attacks of syncope. Sinking or collapse from fat embolism is different from shock. The seizure coming on in suppuration of structures rich in adipose tissue, at periods more or less distant from the date of injury. The symptoms in such cases are sudden pallor, dyspnea, hemoptysis, convulsions, death. Fat will be found in the urine. We have a condition in rupture of the intestines, as in typhoid fever or perforation, in gunshot injuries, permitting escape of the fecal contents into the peritoneal cavity. In a few moments' time the appearance of the patient changes and collapse has supervened. Syncope is due only to disturbances of the circulation, and

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is attended by nausea, ringing in the ears, dizziness, followed by fainting fits, during which the patient is temporarily unconscious. These are symptoms of brain anemia, not of shock.

The prognosis of shock is uncertain and doubtful; the condition often terminates favorably within a few moments, or ends fatally after one or two days. According to Scheever, if reaction does not set in within eighteen hours after the injury, death is inevitable. Among the most significant factors in the case must be reckoned the pulse and temperature. The patient may have been pulseless for several hours, yet if appropriate means of restoration fail to quicken some show of pulsation at the wrist within a few minutes the condition is indeed grave. As before stated, the temperature is perhaps the most decisive symptoms, and in the opinion of Redard and other high authorities, if it sinks as low as 96 or 96½, the patient is quite certain to die. Many eminent writers on the subject agree that a subnormal temperature of two degrees almost surely indicates a fatal termination. Of very grave import also are loss of the power of deglutition, conjunctival insensibility, persistent vomiting, failure to control the sphincters, and protracted coldness and sodden condition of the extremities.

It might be well to discuss coma, epilepsy, alcoholism and apoplexy as differing from shock, but time will not suffice.

But in shock what shall we do? Here it is quite as important to know what *not* to do as *what to do*. Better, perhaps, too little than too much. A rapid reaction may stimulate the heart to fatal hemorrhage, reopening vessels that have become plugged during collapse, the artery having been sealed by nature's own remedy, the blood clot. The patient should as quietly and as quickly as possible be placed in bed or where he is to remain until reaction is secured. The foot of the bed should be raised, so that, with a minimum of effort, the weak heart may be able to send the life-giving current to the exhausted vital centers. Heat should at once be applied to the body and especially to the extremities and to the neighborhood of the heart. Envelop the patient in hot blankets and flannels and surround him with hot bottles, hot bricks, hot water bags, or cans of hot water, taking great care to see that he is not burned. Accidents of this class have often been inflicted which have proven more serious than the primary injury. I would suggest that the bottles or cans which are oftenest used be placed in stockings wrung out of hot water.

Bryant advises brandy by the mouth in small quantities, at frequent intervals, for an hour. Usually at the end of that period the stomach rejects it, when it may be administered in the form of an enema with warm milk, gin, or beef juice. Care should be used not to overdose the stomach with alcohol, as the first attendants may have supplied it to the limit, or the patient may have imbibed freely before the injury. Inhalations of ammonia or amylnitrite often have the happiest effect, completely reviving the patient almost instantly. Hypodermics of digitalis are recommended by Levis, also of carbonate of ammonia and whiskey, notwithstanding the probability of abscess. Caution should be exercised in the use of digitalis on account of its cumulative qualities, which will no doubt be greatly intensified as reaction progresses. Salt solution may be introduced either into the median cephalic vein or into the loose cellular tissue of the axilla, loins or abdominal walls. Da Costa advises the addition of adrenalin to the saline infusion, throwing it through the wall of the infusion tube with a hypodermic syringe or aspirator. The normal solution is placed in a fountain syringe and hung two or three feet above the bed, care being used to interrupt the flow from time to time to obviate overdistension of the right heart and consequent arrest of all cardiac action.

Mumford strongly recommends hot enemata of weak salt solution, first giving a quart and repeating in half an hour. Lange administers a pint of the temperature of the body, with some stimulant mostly claret. These enemata should be given through a flexible catheter and thrown high up the colon. Levis recommends copious hot water injections, not only for resupplying loss of fluids, but as the most effective means of imparting that all-important factor, heat. Holmes remarks that "among the drugs used for the production of reaction are coffee, quinine, digitalis, belladonna, ammonia and ether. These may be

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given by the rectum or hypodermically, if there is danger of producing vomiting, which is always to be avoided as resulting in secondary depression." Da Costa condemns the use of strychnin, insisting that it goads an empty heart to propel blood which it has not within its walls. Hare says that strychnia in shock may be compared to whipping a dying horse. But, does it not increase vascular tone, combat dilatation of vessels which is after all the great desideratum in the case? While these means of restoration are being employed sinapisms should be placed over the heart, epigastrium, spine, wrists and ankles. Abdominal massage and bandages on the extremities are advocated by some. Crile uses a rubber suit to give tone to the peripheral veins.

If shock comes on during operation, obviously this should be stopped until reaction at least begins again. Excessive reaction is to be controlled by soothing remedies, as morphia, codeia, chloral or henbane, which latter, especially, acts in a magical manner, bringing about a few hours of quiet sleep, after which the patient awakens greatly refreshed.

But how far shall the patient be allowed to rally before operating? Does the operation in any measure act as a stimulant and tend to rouse him, or does it act as a second shock and add to the collapse already holding life trembling in the balances? Bryant says that where shock is severe and the patient almost pulseless, it is wiser to postpone operative interference till the heart's action is re-established. To amputate a limb under extreme collapse is to destroy what chance of life exists, or to do an unnecessary operation. To amputate when reaction has set it, after the lapse of a few hours, when external warmth, stimulants and tonics have had their influence, is likely to be followed by success. Pirogoff is not in favor of operating during shock. Senn says "with few exceptions writers on surgery condemn operation during shock," but urges that in case there are factors that demand operation it should be done without anesthesia, his idea being that the insensibility of the patient renders it unnecessary. Holmes says that "the immediate impression which an operation makes on a system already under the influence of shock is considerably less than that under other circumstances." It is claimed by some that the shock of the injury covers and identifies with itself that of the operation, promptly performed. The consensus of opinion is that it is wiser to wait for partial reaction, or until it is evident that reaction is about to set in, before operating; that is, till we find a stronger, fuller pulse, a returning warmth of surface, a livelier interest in the situation, etc. If, however, there is extreme crushing and laceration, where parts can be clipped away or an operation may be done in a minimum of time and hemorrhage or oozing arrested more certainly, better operate at once, especially since in the obtunded condition it may be done without anesthesia. And there are conditions where, without instant operation, death would be inevitable. We should operate, if necessary, to arrest hemorrhage, to relieve strangulated hernia, intestinal obstruction, obstruction of the air passages, ruptured viscera, extravasated urine, compound fractures of the skull. Shall we not then, say as a postulate, that we should have the courage to operate when convinced that death without operation is inevitable, although the chance of life with it may appear remote?

What special safeguards shall be instituted for a patient placed at such manifest disadvantage before subjecting him to the added risk or hazard of operation? Senn says "I have been in the habit for years of preparing patients for grave operation by administering two ounces of whiskey by the stomach or rectum, an hour before the time set for the operation, and by injecting one-thirtieth grain strychnia hypodermically, a few minutes before anesthetizing the patient." To prevent loss of heat and maintain peripheral circulation the body and limbs should, if practicable, be enveloped in warm blankets, during the operation. It is good practice, just previous to its performance, to give a rectal injection of normal saline solution and a hypodermic of one-hundredth grain atropia or one-eighth to one-fourth grain of morphia, which imparts a tranquilizing effect upon the system, so that less ether or chloroform will be required. What I have found invaluable at this juncture both in obstetrics and surgery is a hypodermic of Abbott's "H. M. C." combination, which supports the vital powers and acts as a sedative, and produces sufficient general

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anesthesia as to make minor surgery painless, and in major operations reduce the amount of chloroform or other anesthetics to a negligible quantity.

Let me add, what may not be germane to the subject, as I have chosen to discuss it—in operating I would urge that we exchange at least a part of the flourish and folderol of modern technic for the speed of our fathers.

SPRAINS OF THE WRIST.*

By A. W. RUDISILL, M.D., Memphis, Tenn.

In this paper I do not expect to present anything new, but to call attention to a frequent injury to railroad employees.

In our dispensary service at Memphis for the year 1913, we treated sixty-four injuries of the wrist, or which five were fractures—three Colles', one of both bones of the forearm and one of the os magnum (compound). So we treated nearly twelve cases of sprain to one of fracture. The average loss of time from fractures was seventy-one days, the total loss three hundred and fifty-five days; the average loss of time from sprains was twelve days, the total loss seven hundred and eight days. The results in sprains were fifty-seven recoveries, while in two cases there was ankylosis with considerable loss of function.

In these cases there had been no unusual violence at the time of injury; one patient fell on the extended hand, the other was using a stick to loosen a brake when it flew off and struck the palm of his hand. They presented nothing unusual at the time they came under our care; pain and swelling were prominent. Hot water and lead and opium applications were ordered. Convalescence was prolonged, swelling remained, and function was largely impaired. An x-ray examination was made, and in each case showed enlargement of all the bones of the wrist. The soft tissues seemed to be infiltrated; the bones did not give as dense an appearance as in the usual picture, but resembled that of syphilitic bones. The first few days after the x-ray exposure, the pain and swelling subsided markedly, but returned in a few days and were not relieved by antisyphilitic treatment. The cause of this condition is not plain to me; it is undoubtedly due to some systemic state. We all know with what violent symptoms a slight sprain develops in persons infected with gonorrhea; so it is well to investigate along that line. When an apparently simple sprain does not recover promptly, the use of appropriate vaccines sometimes acts well.

The treatment of sprained wrist is to be adapted to the particular case in hand. My usual plan is hot water, lead and opium, and massage commenced as soon as pain will permit. Where the inflammatory condition extends along the tendons, a smoothly applied roller bandage or a light plaster-of-Paris dressing gives support and rest to the limb.

In our experience, we find about twice as much time lost from sprains of the wrist as from fracture in this region, so that this subject is not by any means a trivial one and should stimulate us to give sprains in all parts of the body very careful attention.

* Read at nineteenth annual meeting of Association of Surgeons of Southern Railway, Washington, D. C., June 18, 1914.

Surgical Gleanings

The Liver in Relation to Operations on the Biliary Tract and the Stomach.—Dr. George W. Crile (*Canad. Med. Assoc. Jour.*, January, 1915) believes that the mortality and morbidity attending gastric and gall-bladder operations may be still further reduced by using methods which minimize trauma, pre-operative and postoperative emotion and pain, and by so doing conserve the energy remaining in the cells of the brain, the suprarenals, and the liver in patients in whom the stores of energy in their kinetic organs have already become depleted by the exhaustion due to the disease from which they seek relief. For these patients the ideal treatment comprises: 1. The pre-operative administration of sodium bicarbonate and glucose and of bromides per rectum. Morphin is contraindicated if acidosis is present or threatened. 2. Ether twilight anesthesia or a light nitrous-oxide-oxygen anesthesia. 3. A technic so accurate and so completely anociated by the use of local anesthetics and gentle manipulations that but a small amount of the anesthetic is needed. 4. As rapid a technic as is consistent with good work, that the period of anesthesia may be as short as possible.

Congenital Dislocation of the Hip.—Dr. C. L. Starr (*Canad. Med. Assoc. Jour.*, January 1915) from his experience in the Hospital for Sick Children of Toronto concludes that about 75 per cent. of the cases under eight years of age can be reduced by manipulation, and a perfect anatomical and functional result obtained. In possibly a small percentage of cases the head is not retained in the acetabulum but slips forward as an anterior transposition, giving what may be called a functional cure but not an anatomical one, the chief defect being a small amount of

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shortening which necessarily remains. In some 5 per cent. of cases it has been found necessary to make the reduction by operative means. The chief hindrances to the re-position of the head as found in such operation, has been the thickened and contracted condition of the capsule. By making a free crucial incision through the anterior portion of the capsule, a grooved instrument, similar in character to a shoe spoon, may be introduced, the end of the instrument reaching the margin of the acetabulum, and the head of the femur may be "skidded" along this hollow into the socket. The Lorenz method has been largely modified by making less forcible abduction and avoiding the preliminary extreme stretching. The limb is also put up in a position of moderate abduction and inward rotation, thus avoiding the difficulty of overcoming the subsequent extreme rotation of the limb. A very necessary feature is the care subsequent to the reduction and application of the plaster. It is essential in order to get a good functional result that the child be put upon its feet as quickly as possible. This is to encourage the bone growth and to prevent atrophy, and at the same time by the pressure of the head in the acetabulum to deepen the cavity and adapt it to the shape of the head of the femur. In cases of single dislocation, this is comparatively easy, as the child can get about with the one limb thus moderately abducted. In the bilateral, it is impossible of course for the child to walk, but some effort at locomotion can be attempted by making a special chair wide enough in the seat, so that the child may sit astride it and just high enough so that the feet will touch the floor. If castors are put on a chair of this sort, the child soon learns to go about freely, and in this way gets a large amount of exercise. In the original position of Lorenz, these plaster spicas had to be left on for from four to five months before being changed. In the modified position of abduction and internal rotation, the plaster may be changed in two months and the angle of abduction very markedly decreased, so that in the course of five to eight months the limb can be brought down parallel with its fellow.

Acute Appendicitis.—Dr. Frank D. Smythe (*Charl. Med. Jour.*, January, 1915) presents the data obtained through correspondence with 900 general practitioners and surgeons relative to the diagnosis, treatment and classification of acute appendicitis. Of the 300 physicians who replied 70 per cent. regarded the disease as strictly surgical from its inception and advised early operation (at least within forty-eight hours after onset of the attack), while 12 per cent. were in favor of operation during the interval or as soon as possible after onset of exacerbations. As might be expected, the one hundred surgeons who answered Dr. Smythe's questions were almost unanimous in stating that every case of uncomplicated acute appendicitis should be operated upon as soon as possible after diagnosis is made, and all but five reported that they had never lost an acute primary case operated upon within twenty-four hours after onset of the attack. The mortality within the forty-eight-hour limit varied from one-half of one per cent. to 10 per cent., at seventy-two hours from one and one-half per cent. to 40 per cent. The remedy offered by the author for the removal of the obstacles to a no death rate in acute appendicitis cases is: First. That the general practitioner, wherever possible, accompany his cases of acute appendicitis to the surgeon and witness the operation and carefully examine the pathology after its removal. It would seldom be necessary for the practitioner to witness but a very few such operations to convince him of the correctness of the views entertained by surgeons concerning the proper treatment of the disease. Second. That the subject of acute appendicitis should be taught in the medical colleges by those teaching in the surgical department only, and that the literature on the subject should be found in text books on surgery and journals devoted to the publication of articles on surgical subjects, for the reason that acute appendicitis, like fractures of bones and tumors of the breast, is strictly a surgical disease. Third. That a physician has no moral right to subject a patient to the hazard of delay by instituting at the outset of an attack of acute appendicitis medical treatment for a disease that is strictly surgical from its inception; for the reason that the vast majority of cases that die, do so owing to the failure of having the proper remedy applied at the proper time.

Tuberculosis of the Genitourinary Tract.—Dr. N. P. Rathbun (*Long Isl. Med. Jour.*, January, 1915) emphasizes two facts: First. The importance of keeping our "ear to the ground" for cases of early renal tuberculosis. Young adults who come to us complaining of frequency of urination and polyuria, worse at night, should be looked upon with the gravest suspicion. Many cases of incipient renal tuberculosis are treated for months with a diagnosis of diabetes insipidus, chronic interstitial nephritis, neurasthenia, or some other equally incorrect diagnosis while valuable time is being lost. Secondly. The presence of pus in the urine is a serious matter and it is of vital importance to determine its source, which can always be done, and its cause, which can be done in a great majority of cases.

Factors Determining the Advisability of Prostatectomy.—Dr. W. F. Braasch (*St. Paul Med. Jour.*, January, 1915), from observations made at the Mayo Clinic, concludes: 1. With stone in the bladder it is usually advisable to remove the stone and drain the bladder for a time prior to prostatectomy. 2. Stone in the bladder may cause temporary enlargement of the prostate. 3. Pyelonephritis is a frequent complication of bladder drainage and a strong resistance should be established before attempting operation. 4. The renal condition prior to operation can be estimated best by clinical evidence. 5. Cystoscopic examination, while valuable in certain con-

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ditions, may be the cause of harm if used as a routine procedure. 6. Urethroscopic examination is occasionally of greater value than cystoscopic examination. It is particularly valuable with intraurethral hypertrophy and with carcinoma. 7. Subacute prostatic infection may simulate carcinoma on clinical examination.

Endoaneurysmorrhaphy.—Dr. H. B. Gessner (*New Orl. Med. and Surg. Jour.*, January, 1915) reports a case of varicose aneurysm of the popliteal and femoral vessels in which he operated successfully by the Matas method. The vascular lesion was the result of a bullet wound received twenty years before. Under spinal anesthesia the sac was laid open along the sartorius and its several diverticula emptied of clots and laminæ. At least three openings were closed with Lembert sutures, one of them clearly recognizable as arterial. A large cavity which extended under the posterior muscles as well as smaller diverticulæ were packed with iodoform gauze. Chromic gut and linen were used. Dr. Gessner has employed the Matas method in six other cases without mortality. Four of the operations were obliterative and three restorative. One patient died eighteen days after its performance of erysipelas, another of prostatic abscess.

Treatment of Osteomyelitis.—Dr. M. B. Clopton (*Surg., Gyn. and Obst.*, January, 1915) summarizes the treatment as follows: 1. In the acute stage: Drainage of medulla. 2. In the subacute stage: (a) humerus and femur—drainage and sequestrotomy. (b) Tibia, fibula, radius, ulna—subperiosteal excision. 3. In the chronic stage: (a) Sequestra — removal, drainage with iodoform wax. (b) Brodie's abscess—evacuation, closure over blood-clot or iodoform wax. When possible to locate with the skiagraph the bone involvement to measure its extent, the shaft is exposed and a lid of cortex is removed throughout the length of the inflamed medulla. If the case has progressed to abscess formation either beneath the periosteum or in the soft parts, after these have been incised the shaft is opened along one side. Drainage is sought for only part of the infected medulla, and no effort should be made to "clean out" the infection. Our endeavor should be to spare the infected bone-cavities as much as possible to get the benefit of all the endosteal regeneration possible. In subacute cases the cavity left by the extraction of the sequestrum should be dealt with very gently, wiping it out with gauze alone, which removes from the inside of the involucrum very few of the granulations on which we must depend for the new shaft. Mosetig-Moorhof's iodoform wax is considered the most satisfactory dressing. In the pus-producing acute stage the bone-cavities and abscess of the soft parts are dressed with gutta-percha tissue, but in the late subacute or chronic stage the wax is used exclusively. The advantages are that it will heal in without acting as a foreign body; and should any drainage be necessary, the discharge can escape beside the plug and reach the surface.

Pylorectomy and Partial Gastrectomy.—Dr. W. L. Rodman (*Surg., Gyn. and Obst.*, January, 1915) formulates his experience with pylorectomy and excision of the ulcer-bearing area in the treatment of gastric ulcer in the following conclusions: 1. If the ulcer or ulcers are situated in, at or near the pylorus, as they are in about 80 per cent. of all cases, and the pyloric end of the stomach and proximal portion of the duodenum can be easily mobilized, pylorectomy, which gets rid of the existing ulcers and prevents future ones to a large extent, removing, as it does, four-fifths of the ulcer-bearing area, is certainly the operation of choice. The frequency with which hemorrhage, perforation and cancer, especially the latter, follow gastroenterostomy, shows it to be wholly inadequate. Moreover, the radical operations of excision and pylorectomy are only slightly more dangerous while far more beneficent in every way than gastroenterostomy. 2. If, however, the converse obtains, the stomach and duodenum being bound down by adhesions to adjacent viscera, such as the pancreas, liver, gallbladder, transverse colon, etc., simple gastroenterostomy, the anastomosis being made about the middle of the stomach, should be practiced. If the symptoms are not relieved within a reasonable time, then pylorectomy may be performed more safely. Before such a step is taken the operator should be assured that the gastroenterostomy is potent and functionating. 3. The operation can also be done in two stages in those patients not in good condition, whether it be from hemorrhage, anesthetic or other cause. It is often best to perform pylorectomy for cancer in two stages, and practically the same is true in ulcer operations, but it will be much less frequently the case. 4. Gastric ulcers, duodenal as well, are more frequently multiple than is appreciated; some excellent authorities state that such is usually the case. With the number and chronicity of ulcers potential dangers are increased, and radical measures are more urgently called for. 5. Ulcers away from the pyloric end, that is, occupying the expanded four-fifths of the stomach, should preferably be treated by partial gastrectomy or removal of the ulcerated area. Although such ulcers rarely undergo cancerization, they frequently bleed and perforate, both of which dangers are increased by the freer movements of this portion of the stomach during respiration. Moreover, on this account protective adhesions are less apt to form about them, if we except the lesser curvature, which is relatively immobile. If simple excision is practicable, it should be done, as it produces a smaller mortality (1.7 per cent.) than gastroenterostomy. 6. In some cases it may be wise, though it is not usually so, to supplement excision by gastrojejunostomy. It all depends upon the location and size of the ulcer and whether or not the stomach can presumably carry on its functions without irritating, stretching, or otherwise interfering with the line of suture.

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Original Articles

DISEASES OF THE NOSE, THROAT AND EAR FROM THE PRACTITIONER'S VIEWPOINT.

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In this series of articles on nose, throat and ear diseases I hope to present facts which will be of real service to the general practitioner and to the general surgeon who is called upon from time to time to treat these conditions. Especial emphasis will be laid upon diagnosis and treatment, and the text will be illustrated by original drawings and reproductions wherever they are needed to make the subject clearer.

Clinical Anatomy of the Upper Respiratory Tract.

THE NOSE.

The external nose adds greatly to the cosmetic appearance of the face, as is evidenced in the horrible deformities when it is absent. It varies greatly in shape, from the short pug nose to the long aquiline Roman type. It consists of a bony and cartilaginous framework covered by skin and muscles. The skin is loose and thin over the nasal bones, but thick and closely adherent over the cartilaginous portion. The groove in the skin between the nose and cheek is a favorite site for incisions, as in the excision of the superior maxillæ and other operations, because a scar in this position is scarcely visible. The skin is highly vascular, which accounts for the rapidity with which wounds heal over the nose, as well as for the redness of the tip from heat, cold and alcohol. It is richly supplied also with sudoriferous and sebaceous glands, making it a favorite site for acne, lupus, lupus erythematosus, epithelioma, etc. As the tip is so exposed it is a frequent site for frostbite. The great pain experienced in furunculosis of the nose is due to the density of the closely united skin and subcutaneous tissues causing great pressure. Swelling due to congestion causes pressure upon the nerve endings and consequently pain. The skin is supplied by branches of the first and second divisions of the fifth nerve.

The osteo-cartilaginous layer forms the framework of the nose, which is supported by the nasal septum. The mobility of the lower or cartilaginous portion of the nose obviates many fractures, which are most common through the lower, most prominent and thinnest part of the nasal bones. In the upper third fracture is most rare on account of the thickness of the nasal bones, but most serious here, as it requires great force, which is apt to be communicated to the base of the skull through the vertical and cribriform plates of the ethmoid bone, causing indirect fracture at the base of the skull. As the mucosa is intimately adherent, it is apt to be torn, causing compound fracture and epistaxis. Owing to the generous blood supply union is very rapid.

The limits of the cartilaginous part should be borne in mind in examining the nose with a nasal speculum, as its introduction beyond these parts causes pain. The cartilages of the nose are the two upper lateral, two lower lateral (alæ cartilages), and the triangular columnar cartilage of the septum, and some lesser alæ and sesamoid cartilages. The lateral cartilages form the contour of the nose. The triangular cartilage of the septum is frequently deflected to one side, causing nasal obstruction. The modern submucous resection is a conservative and efficient means of relieving this condition.

The nasal fossæ open in front by the nostrils and communicate posteriorly through the choanæ with the naso-pharynx. The nostrils or anterior nares

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look downward and are at a lower level than the floor of the nose. Hence in examining the nose through a nasal speculum, the head should be thrown slightly backward and the tip of the nose gently elevated. The portion of the nasal fossa between the anterior nasal orifice and the nostril is the vestibule, and differs from the rest of the fossa in that it is covered by the cartilaginous part

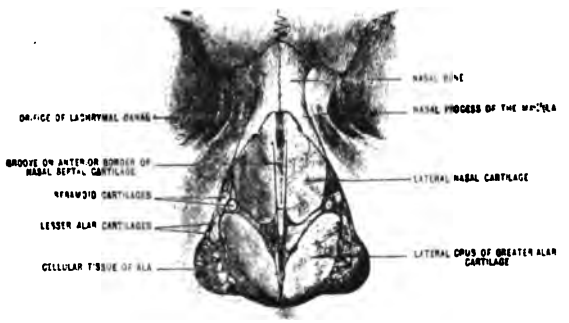


Fig. 1. Ventral view of external nose showing its cartilages (Morris' Anatomy).

of the nose, and is lined by squamous epithelium—a continuation of the skin. This is beset near the nostrils with stiff hairs (vibrissæ), which serve to filter the air and to arrest particles of dust. It is also provided with sebaceous glands.

The posterior nares are symmetrically placed on each side of the nasal septum and open into the naso-pharynx. They are called choanæ of the nose,

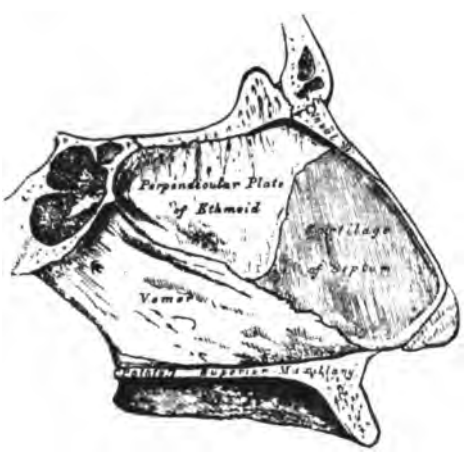


Fig. 2. Bones and cartilages of septum of nose, right side (Gray's Anatomy).

and their dimensions are about one inch to an inch and a quarter vertically, by half an inch transversely, in the skeleton. It is sometimes necessary to pack them with gauze or a tampon to arrest nasal hemorrhage.

The nasal fossæ lie beneath the cranium above the mouth, and between the orbits and maxillary sinuses. They are narrow above but broad below, the floor being the widest part of the nasal fossa, and measures at its center or widest part from one-half an inch to three-fifths of an inch. It is smooth, concave transversely, and slanted slightly downward behind so that in the erect position secretions drain backward to the pharynx. The roof of the nasal fossæ is extremely narrow; and it has been penetrated by accident in intranasal operations and the cranium entered through the thin cribriform plate of the ethmoid. In such cases, or in fracture of this plate involving the mucosa, there is bleeding from the nose, and if the subarachnoid space is opened there is escape of cerebrospinal fluid through the nose, and the danger of meningitis is great. In fact, meningitis has been reported from extension of inflammation of the nose through an

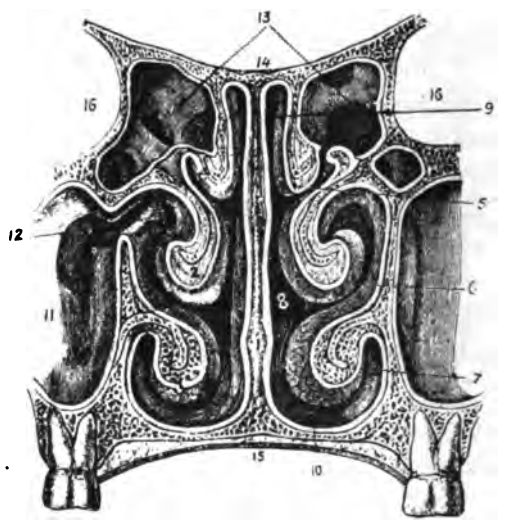


Fig. 3. Anterior section of nostril. (After Luschka.)

intact mucosa. Behind, the roof slants abruptly downward and is formed by the anterior surface of the sphenoid, containing the openings of the sphenoidal sinuses.

The median wall or septum of the nose is normally straight in children, but in about 75 per cent. of adults there is more or less deviation. It is formed anteriorly by the triangular columnar cartilage, posteriorly by the perpendicular plate of the ethmoid, and below by the vomer. The deviation may follow a blow on the nose, or may be due to constantly blowing the nose with one hand. In right handed persons, who always blow their noses with their right hands, the deviation will be to the left, and in left-handed individuals the reverse is true. It is also due to faulty development of the

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anterior dental arch, which does not grow at a pace commensurate with that of the septum. The mucosa covering the nasal septum is blended with its periosteal and perichondrial covering into a single dense layer, which is loosely attached to and easily separated from the septum.

The outer wall of the nose has a general slant from above downward and outward. The inferior, middle and superior turbinate bodies, scroll-like bones, largely form the interior of the outer nasal wall. The anterior attachment of the inferior turbinate is at the anterior limit of the bony outer wall, and is about four-fifths of an inch from the nostril. It extends backward the whole length of the nasal fossa, and its posterior tip is in the posterior naris at about the same level as the opening of the eustachian tube. This posterior tip frequently becomes hypertrophied as the result of chronic suppuration of the accessory sinuses. When this takes place, great relief from nasal stuffiness and eustachian catarrh is obtained by snaring off with a cold wire snare the posterior tip. It bleeds freely for a few moments, but soon stops spontaneously. I have performed this little operation upon several hundreds of patients and have never found it necessary to pack the nose to arrest the hemorrhage. The inferior turbinate has a very important function, and it should never be removed entirely except for malignant disease or tuberculosis.

The middle turbinate is situated just above the inferior on the outer nasal wall. Its anterior end is inclined upward, reaching the level of the inner canthus of the eye. The superior and middle turbinates are convoluted parts of the lateral mass of the ethmoid bone.

For purposes of description the nasal fossæ are divided into three recesses, called superior, middle and inferior meatuses of the nose. The superior meatus is the space between the superior and middle turbinate bones. The middle meatus the space between the middle and inferior turbinate bones, and the inferior meatus the space between the inferior turbinate bone and the floor of the nose. By the location of pus in these meatuses the differential diagnosis of sinus disease can be made. Its location in the nose determines whether it comes from the anterior or posterior group of sinuses. The superior meatus has an orifice for the posterior ethmoid cells, and occasionally for the sphenoid. The middle meatus contains the opening for the frontal



Fig. 4. The nasal chamber, sagittal section, made from two subjects showing great variations in the depth and size of the external walls of the nasal chambers. The upper picture shows four meati, while in the lower there are but three. In some specimens five meati are found. A composite picture of these two will give a fair average of the external wall of the usual nasal chamber. (Imperial Publishing Company, N. Y.)



Fig. 5. Vertical, transverse, bilateral section. Posterior view of a section posterior to the premolar teeth. On either side a wire has been passed from the two frontal sinuses down through the ostium frontalis into the hiatus semilunaris and thence into the maxillary sinus; the wire on the left side can be seen at various points as it passes downward. This condition indicates direct communication between the frontal and the maxillary sinuses, a condition often found. There are also two large cells between the plates of the middle turbinates. In the upper median corner of the maxillary sinus, especially in the left one, is a septum forming an infra-orbital sinus. (Imperial Publishing Company, N. Y.)

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sinus, and the anterior group of ethmoid cells empty their secretion here through the infundibulum and sulcus semilunaris. The middle ethmoid cells and the antrum of Highmore also empty into the middle meatus. Those sinuses which empty into the superior meatus are known as the posterior series, and those which empty into the middle meatus are known as the anterior group. The inferior meatus has the opening for the nasal duct in front, and this opening is guarded by a circular fold of mucous membrane called the valve of Hasner.

The nasal fossæ communicate with:

1. The orbit by the lacrimal groove.
2. The cranial cavity by the nasal slit and olfactory foramina in the cribriform plate of the ethmoid bone.
3. The mouth by the anterior palatine canal.



Fig. 6. Vertical, transverse, bilateral section, posterior view. At the anterior superior angle of the antrum is seen a cord marking the passage, ostium maxillare, from the antrum into the hiatus semilunaris. In the floor will be seen the septum and on the left side the palatal and anterior buccal roots of the first molar teeth in the walls of the antrum. The position of these roots is very interesting to students of the diseases of the antrum, as teeth of this character sometimes cause infection of the maxillary sinus, whence it is transmitted to the other pneumatic spaces of the face. In the majority of the skulls of the white race examined, roots of the molar teeth are found in the walls of the antrum, covered at the point, where they approach the surface, by only a thin conical shell of bone. (Imperial Publishing Company, N. Y.)

4. The spheno-maxillary fossa by the spheno-palatine foramen.
5. The accessory sinuses through their respective outlets.
6. The middle ear and mastoid antrum through the eustachian tube, which opens into the naso-pharynx.
7. The pharynx through the naso-pharynx.

The mucous membrane in the upper or olfactory region of the nose, including the middle and superior turbinates and the upper one-third of the septum, is of the columnar type. The lower or respiratory portion, including the rest of the nasal fossa, is covered by columnar, ciliated epithelium. On the outer wall between the turbinates and on the floor the mucosa is thin. Elsewhere it is very thick, as over the inferior turbinate. This thickness is due largely to the abundant submucous venous plexus, which extends antero-posteriorly over the turbinates.

The blood supply of the nose is derived from the ophthalmic, the facial and the internal maxillary arteries. The veins, in addition to accompanying the arteries, communicate with the superior longitudinal sinus. This communication, and that of the cavernous sinus through the ophthalmic veins, help to explain intracranial complications arising from inflammatory processes within the nose.



Fig. 7. Frontal sinus. An anterior view of two very large frontal sinuses, which extend backward over the orbit, where they are divided by several incomplete septa. They also extend downward as indicated by the wires and communicate directly with the maxillary sinuses. The right and left each measure horizontally 50 m.m., and their depth is 40 m.m. (Imperial Publishing Company, N. Y.)

The lymphatics communicate through the cribriform plate with the subdural space, and also enter the upper nodes of the internal jugular chain (deep cervical), the sub-maxillary and retro-pharyngeal. Retro-pharyngeal abscess may therefore be due to disease of the nose.

The nerve supply of the nose is the nasal nerve, Meckel's ganglion and the olfactory. All accessory sinuses are supplied by Meckel's ganglion except the frontal, which is supplied by the supra-trochlear. The olfactory is distributed in filaments over the

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upper third of the septum, superior turbinate, inferior turbinate and ethmoid anterior to the inferior turbinate bone.

The Pharynx.

The pharynx is situated behind the nasal and oral cavities, and extends from the basilar process of the occipital bone to the lower part of the cricoid cartilage opposite the sixth cervical vertebra. The velum of the soft palate divides it into an upper nasal portion called naso-pharynx and a lower portion called the oro-pharynx and laryngo-pharynx. The two posterior nares, which are in front, and the two eustachian tubes, one on each side, open into the naso-pharynx. Below the velum of the soft palate are the opening into the mouth anteriorly and the openings into the esophagus and larynx below, making a total of seven openings into the pharynx. Its length from above downward is about 4⅝ inches. It is wider transversely than antero-posteriorly. Its widest portion (1¾ inches) is between the fossæ of Rosenmüller, and its narrowest (⅗ inch) is at its lower end where it is continuous with the esophagus. Foreign bodies in the pharynx, of which numerous varieties have been reported, are usually found at its narrowest part, which is about six inches from the incisor teeth, just beyond reach of the fingers.

The pharynx is complete behind and at its sides, but incomplete in front at the openings of the posterior nares above, the faucial openings of the mouth and the upper opening of the larynx below. The anterior part of the pharynx is patulous by reason of its attachments to bones and cartilages.

The walls are composed of a fibrous coat, the pharyngeal aponeurosis, lined by mucous membrane and surrounded externally by muscular layers invested by a layer of loose areolar tissue, which permits of movements of the pharynx and also of extension of retro-pharyngeal abscess.

The mucous membrane of the pharynx is continuous with the several cavities which open into it. It is closely adherent, thick and dark colored at the base of the skull. In the naso-pharynx the epithelium is stratified, ciliated, columnar, and in the oro-pharynx it becomes stratified pavement.

The lymphatics of the pharynx pass to the upper deep cervical nodes, and those of the upper part pass first through the post-pharyngeal nodes.

Clinically the naso-pharynx is the site of hypertrophy of lymphoid tissue (adenoids) so commonly observed in children as a result of bacterial irritation. On account of the encroachment of the adenoid tissue on the orifices of the eustachian tubes great damage may be caused by them to the auditory apparatus. The only prophylaxis of middle ear inflammation and mastoiditis is therefore an unobstructed and normal nose and naso-pharynx. Retro-pharyngeal abscess is another serious disease of the pharynx. This affection may cause death by its rupture and aspiration of the pus or by asphyxiation.

The Tonsils.

The faucial tonsils, composed of lymphoid tissue and held together by a varying amount of connective tissue, are two ovoid bodies situated one in each of the recesses between the anterior and posterior arches of the fauces and beneath a small fossa, the supra-tonsillar fossa. They vary greatly in size, but a normal tonsil (in size) should not project beyond the pillars of the fauces. They are enclosed within a capsule, and their free surface presents from eight to fifteen crypts or recesses which dip down into the body of the tonsil. These crypts frequently become filled up with bacteria, particles of decayed food giving rise to inflammation and a very foul odor to the breath.

The tonsils are freely supplied with blood by the following arteries:

1. Dorsalis linguæ from the lingual.
2. Ascending pharyngeal from the external carotid.
3. Ascending palatine from the facial.
4. Tonsillar from the facial.
5. Descending palatine from the internal maxillary.

The veins of the tonsils form a plexus which lies upon the outer side of the glands, that is, on the posterior pillar, and opens externally into the pharyngeal plexus.

The lymphatics of the tonsil communicate with those of the dorsum of the tongue, and pass to a node which lies near the angle of the jaw. The node becomes enlarged from tonsillar infection and is easily palpable externally at this time. To the inexperienced it may be mistaken for a tonsil. The tonsil is not palpable externally.

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The nerves of the tonsil are branches of the fifth and glosso-pharyngeal.

THE TONGUE.

The chief clinical features of the tongue, besides the indications it gives of systemic conditions, are a plexus of veins at its base and a frequent hypertrophy of the lymphoid tissue also at its base (lingual tonsil). Varicosity of this plexus of veins is frequently met by the laryngologist. The presence of the lingual tonsil completes Waldeyer's ring, and often causes hoarseness, cough and nervous symptoms when hypertrophied as a result of congestion and colds.

THE LARYNX.

The larynx is a tubular organ, the walls of which are composed of cartilages and elastic membranes covered within by mucosa. The cartilages are the

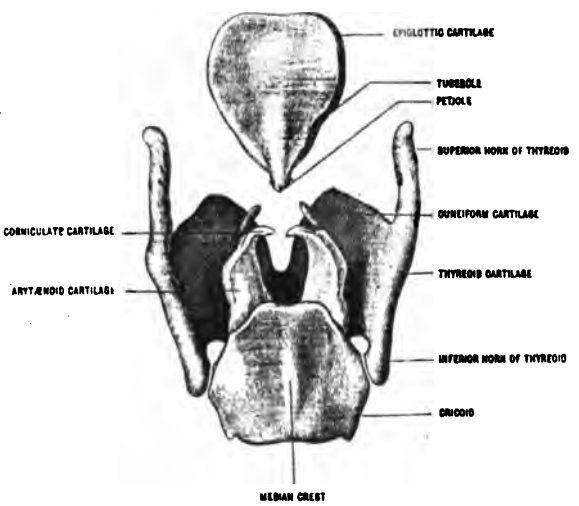


Fig. 8. Cartilages of the larynx (Morris' Anatomy).

thyroid, the cricoid and epiglottis, which are unpaired; the arytenoids, the cartilages of Santorini and the cartilages of Wrisberg, which are paired.

The thyroid, the largest cartilage of the larynx, consists of two broad laminæ which meet and are fused at right angles anteriorly, partly covering the other cartilages anteriorly and laterally. It is connected with the hyoid bone by a strong fibrous band, the thyro-hyoid membrane above, and a like membrane (the crico-thyroid membrane) connects it with the cricoid below. The superior part of the thyroid in front is very prominent in the male and is called Adam's apple.

The cricoid has been compared to a signet ring, and upon it rest the other cartilages of the larynx. Its position is at the lower end of the larynx, where it is connected with the first ring of the trachea. Its posterior part is broad, and it forms the posterior boundary of the larynx. Anteriorly and laterally it forms a narrow arch.

The arytenoids are two pyramidal cartilages which surmount the lamina of the cricoid cartilage,

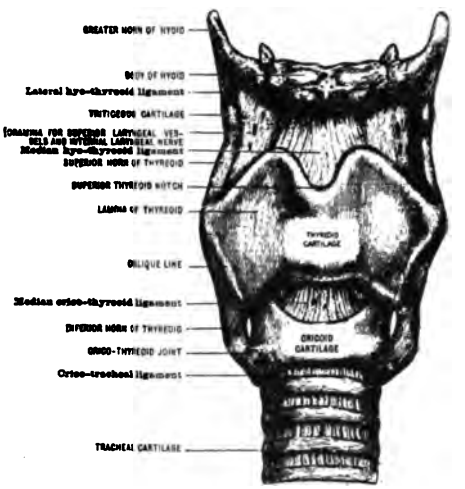
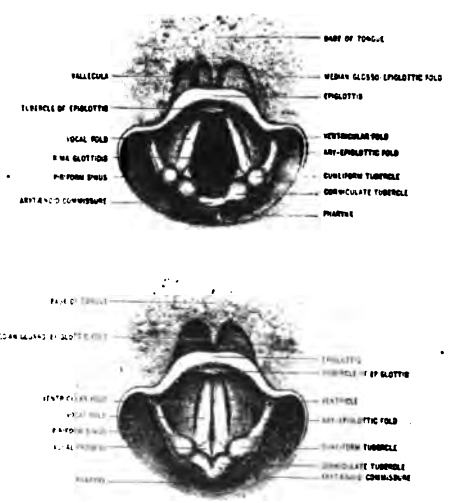


Fig. 9. Front view of laryngeal skeleton (Morris' Anatomy).

and they are moulded for the attachment of various muscles. To the arytenoids the vocal cords are attached posteriorly, and to the free mobility of the arytenoids is due the various movements of these vocal folds.

The cartilages of Santorini are superimposed up-



Figs. 10 and 11. Interior of the larynx (Morris' Anatomy).

on the arytenoids, and in the lower animals the cartilages of Santorini are not independent of the arytenoids. Sometimes in man the two cartilages are continuous. The cartilages of Wrisberg are two rod-like bodies in the aryepiglottic folds anterior to

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the cartilages of Santorini. They are sometimes absent. In the lower animals they are parts of the epiglottis. In man the cartilages of Wrisberg are of interest from a clinical standpoint because they are a frequent site of syphilitic and tubercular infections.

The epiglottis, a thin and leaf-shaped cartilage, stands behind the root of the tongue and the body of the hyoid bone. It is above the thyroid cartilage in front of the entrance to the larynx. Its upper free margin is convex or notched, and its lower end tapers to a short stalk. It is attached to the base of the tongue by three ligaments which form two fossæ, the glosso-epiglottic fossæ, in which foreign bodies are frequently found.

The cartilage found in the thyroid, cricoid and the greater part of the arytenoids is of the hyaline variety. That found in the other cartilages is of the elastic type.

THE VOCAL CORDS.

The vocal cords are two bands of yellow elastic tissue, attached anteriorly to the thyroid cartilage and posteriorly to the arytenoids. The normal color is nearly white, excepting at their anterior ends, where there is a yellow spot produced by a little mass of elastic tissue, sometimes cartilage. The space between the cords is known as the glottis, or rima glottis. The portion of the larynx *above* the vocal cords is called the supraglottic region, and that *below* the cords is the subglottic region. The mucous membrane of the vocal cords is thin and is covered with stratified epithelium, beneath which there is no loose submucous connective tissue. There is therefore no chance for acute edema of the vocal cords. The so-called edema of the glottis occurs in the submucous tissue above the glottis.

"The mucosa is thickest and the submucosa most abundant in the aryteno-epiglottic folds, the ventricles and the false vocal cords, and under the surface of the epiglottis in the order given; and the degree of congestion and swelling in acute laryngitis varies accordingly." For the relief of dyspnea due to edema of the glottis intubation or tracheotomy is frequently necessary.

The ventricular bands often called the false vocal cords are two crescentic folds of mucous membrane enclosing the superior thyro-arytenoid ligaments parallel to the true vocal cords, slightly above and to the outer margin of the cords. They extend into the larynx from the lateral wall, and with the true vocal cords form the two lateral ventricles of the larynx; that is, the spaces between the true and false vocal cords are called the ventricles of the larynx or ventricles of Morgagni.

The nerve supply of the larynx is from the recurrent and superior laryngeal nerves, the former of which is a branch of the pneumogastric. The superior laryngeal nerve is the sensory nerve of the mucosa. Contrary to former belief, recent researches have brought into question the idea of sharply limited territories of innervation both for the mucosa and the muscles of the larynx. The distribution and functions of the laryngeal nerves are quite complex.

40 East Forty-first St.

(To be continued.)

ORIGINAL USES OF THE INLAY BONE GRAFT IN FRACTURES, POTT'S DISEASE, AND DEFORMITIES.*

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As far as I know, all of the applications of the bone graft which I shall present in this paper are original with myself, and there is so much technic to go into that I scarcely know where to begin or where to leave it. I will, however, after a hasty consideration of the bone graft, begin with a demonstration of my motor mill which I always use in all plastic bone operations, and then enter into the various modifications of technic involved in the different applications of the bone graft.

I have been using the inlay graft in the treatment of fractures and Pott's disease since 1911, and have secured union in every instance in a series of 42 cases of fresh and ununited fractures. Many of the ununited fractures were of the most desperate character. One of the series had been operated upon seven times, including intra-medullary grafting. In three of the series, the intra-medullary graft had been unsuccessfully employed; two had been operated upon unsuccessfully three times, and three of the cases, twice.

Just what happens to the bone graft from a microscopic standpoint is still a matter of discussion. Whether the bone graft lives as such, or whether

* Read before the Lehigh Valley Medical Association annual meeting, 1914.

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the cells wander into it from the bone with which it is connected, is still a mooted question. In my experience, both human and animal, I have had perfect union of the autogenous aseptic graft with the bone into which it was placed in 100 per cent. of cases, and, after all is said, this is the important consideration.

The bone graft is being widely discussed, and I believe that you can divide the men that are discussing this problem into two classes: those who claim that a certain portion of the cells in the graft live and that the graft is a distinct and separate osteogenetic force; and those who claim that the cells of the graft do not *per se* have any osteogenetic power, and that the graft merely serves an osteo-conductive purpose. There are at present, however, very few who continue to uphold this view (osteo-conductive), especially since Barth, its originator, has been convinced that his former position was wrong and that the cells of a portion of an autogenous periosteal covered bone graft live and play an important osteogenetic rôle.

I believe that we should not be too dogmatic concerning the exact rôle that every graft must play. Individual conditions or individual environment determine the exact rôle of the graft. We have different conditions to meet. We may have a considerable blood clot, or tissue shreds, which interfere with the nourishment of the graft, preventing an immediate and perfect union; or we may have infection and other disturbances to deal with. It fortunately does not matter from a surgical standpoint what happens, so far as the exact rôle of the graft is concerned. We do know that the autogenous bone graft always takes and becomes permanent if we put it in under aseptic conditions, and it has function to perform. This is the type of graft which I am describing and which I am always using in my work—that is, the graft which has skeletal function to perform.

When I began to employ the inlay bone graft in the treatment of fractures and Pott's disease of the spine, hand tools were used, the chisel and mallet being the first employed in obtaining the graft.

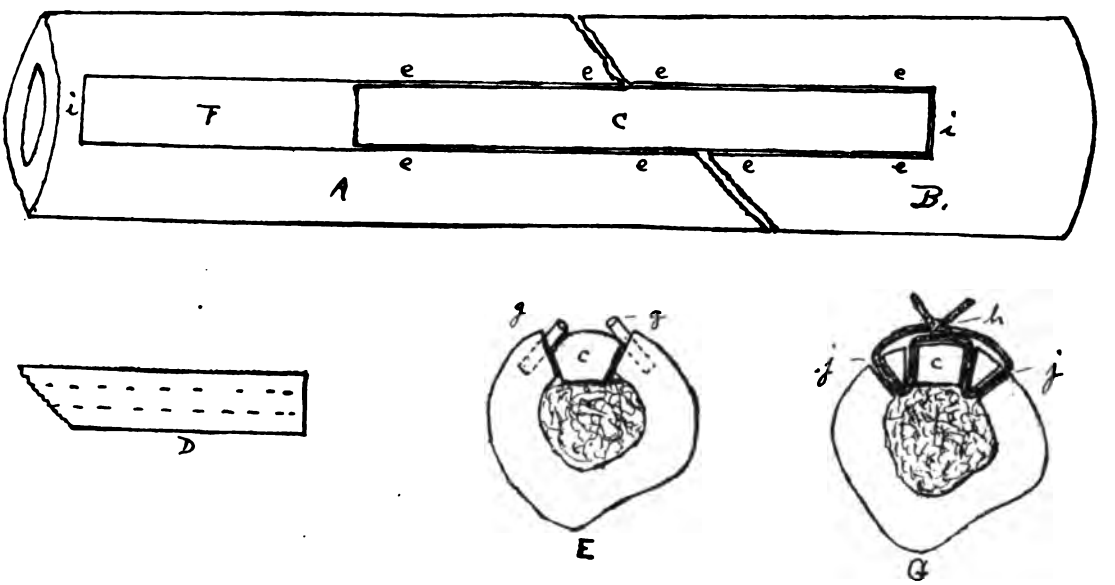


Fig. 1. Diagram illustrating the author's application of a sliding-inlay-graft to an oblique fracture of a long bone as a substitute for a Lane's plate. The inlay should always be inserted, when possible, on the side of an oblique fracture as indicated in this drawing. Overriding of fragments and shortening of limb is thus prevented by virtue of the mechanics of the inlay. With the author's twin-circular motor saw adjusted (as to distance apart) according to the diameter of the bone, parallel cuts to the marrow cavity are made extending into the upper fragment if possible for a distance varying from 4 to 6 inches. The cuts are then extended into the lower fragment one-half the distance, or 2 to 3 inches. These strips of bone are cut off at i with a very small circular saw. The short strip of bone D is removed from the lower fragment, producing a cortical gutter, and the longer strip C from the upper fragment is slid into this gutter in the lower fragment. It then remains to choose between heavy kangaroo tendon or bone dowel pegs to hold the inlay in place and thus immobilize the fracture-fragment. If the fracture is a fresh one and in a bone where the fixation is difficult and the marrow cavity is large and unfilled with dense bone, the graft and its gutter bed had best be made with a wedge cross-section (see C in drawing 3), and pegs used to hold the graft in position. In this instance the twin saw is allowed to cut only 1-16 of an inch deep into the surface of the fragments; this determines the uniform width of the graft and its gutter bed. The saw-cuts in the cortex are completed to the marrow cavity in convergent planes with the single motor saw. The fragment D is cut longitudinally along the dotted lines with motor saw into two or three fragments which are pushed through author's motor-surgical lathe and turned into round dowels, each 2 or 3 inches long. These are cut with motor saw into short pegs (g) and are placed in drill holes over the graft, as indicated at (g) and (e), while the inlay is held securely in place with a Lowman or Berg clamp. These holes are made with a motor drill which is the counterpart in size to the dowel cutter with which the pegs were made. Therefore the fit of the pegs must be accurate. If kangaroo tendon is chosen as the fixation agent, h indicates the tendon tied at that point, (j) and (e) indicates the location of the drill holes through which the tendon is passed. To prevent the graft displacing into the marrow cavity two strands of tendon may be used in each drill hole at (j j), and one strand placed over and the other under the graft (at e.e.e.e.).

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After doing about fifty of these operations and thoroughly realizing the inadequacy of all hand tools I turned to motor-driven saws, both those actuated by flexible shafts transmitting power from a motor on a nearby table, and one which had been designed by Drs. Hartley and Kenyon. These, however, did not meet my requirements, and about a year and a half ago, with the co-operation of the Kny-Scheerer Company, I began to perfect the motor mill which I am now using with so much satisfaction. It is almost like a cabinet-maker's or carpenter's mill. With it we can saw bone, drill it, turn it into nails (with attached lathe), or mold it into any shape or form required, with accuracy and speed, so that we can devote ourselves to the fixation-ligature work and delicate tissue work that is necessary with the least amount of fatigue, time, and trauma. All the heavy and laborious bone work is done by electrical power. The surgeon can also accomplish many things with motor driven tools which it would be impossible to do with hand tools.



Fig. 2. a is author's surgical motor with attached saw and automatic spray-guard, f, which is an important feature of this outfit. By means of this spray attachment a constant spray of cool saline solution is maintained on the saw to prevent heating, at the same time that the guard prevents accidental touching of the saw with surgeon's hand, etc., and flying of the solution from the centrifugal force of the saw. b is the twin saw described in the text. d is the drill used for general purposes. c is the right angled twin saw attachment for use in deep wounds and difficult bone regions to get at. e is a large drill used for drilling the fractured neck of the femur for the purpose of inserting a large tibial bone graft peg.



Fig. 3 is author's doweling instrument or surgical lathe for forming pegs of different sizes for fixing inlay grafts or for fracture of the neck of the femur. The shaft (a) is inserted into the motor precisely as a drill or saw would be. The motor outfit is then rested on the operating table parallel to and near its edge. While the assistant gently presses both the motor and surgical lathe against the top of the table, the surgeon pushes a strip of bone through the cutter (b). The graft dowel thus formed can be pushed completely through and pulled out on the other side or it can be inserted part the way through and pulled back.

As attachments to this motor, we use circular saws of different sizes, twin and angular saws, drills, burrs, and dowelling instruments of different sizes. By means of these appliances, we cut bone into any desired shape without splintering or crushing it. The twin saws cut bone into inlays, or make grooves for the same of exactly the same uniform width throughout, thus assuring a "cabinet-maker's fit," and it is just this fit that may mean success or failure. In cases of fresh fracture, the bone being normal, the material can be taken from the fragments themselves and used as bone grafts. This, as well as other similar inlay technic, would be difficult without the use of the circular saw. The motor saw has opened up a field of bone plasty and of application of the bone graft in various forms that it has been impossible to develop heretofore.

This outfit is easily portable and light in weight and can be used wherever an electric current is available. It is a universal motor weighing about 4 pounds and has practically the same amount of power when actuated by any variety of electric current. It is readily put together. The nurse holds the large end of the motor while the operator, with gloved hands, places the long half of the shell over the end of the motor. By turning the shell to the right as far as it will turn, it is held in place on the motor by thread and screw. The other half of the shell is then put on and locked with a bayonet fitting. The saws and attachments are held in place by an automatic catch similar to that of a dentist's engine, which is most important for speedy work. The handle is at right angles to the motor, thus favoring accurate control. The shells and cord through which the current is passed to the motor, as well as the attachments, are thoroughly sterilized by boiling before being put together (Hartley-Kenyon method). The cord or cable through which the current is applied is flexible and allows the freest motion. The cutting tools, on account of the automatic catch which holds and releases them, can be changed in as little time as it would take the operator to select an instrument from the instrument table. The dowelling attachment has been modified so that large and small dowels can be made. It has two cutters—one to cut a dowel graft to fit the opening made by a No. 26 ordinary machine drill, the other, for a much larger

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dowel graft for an ununited or fresh fracture of the neck of the femur. The small dowel grafts are used for various fixation purposes, such as to take the place of metal screws, nails, wire, etc., also to hold in place the large inlay grafts.

In place of wire I always supply kangaroo tendon. During the last two years I have not used metal for any internal fixation purpose. Metal has a destructive influence upon bone and frequently adds an inhibiting influence which may be sufficient to prevent the fractured bone from uniting. An osteoporosis or necrosis usually develops around the metal screws or nails, causing them to loosen and drop out in a very short time. Then, too, metal favors infection, absorption, and disintegration of tissues. Instead of Lane's plates or other metal plates, I employ the inlay graft, which is made at the time of operation, for all cases of fracture of long bones. For balancing up deformities of the limbs, especially of the feet, I have been using bone graft wedges, mostly taken from the tibia or opposite side of the foot.

The single circular saw is employed in making cuts, just as one would use a hand saw, but it is much more accurate and has a much greater range of application than any hand saw. A guard and spray attachment has been devised to be used in connection with the single and twin saws to prevent heating of the saw, accidents, and to keep the solution from flying into the operator's face. The saline solution is conducted to the spray through a sterile rubber tube from a douche bag elevated above the operating table.

The twin saw is used in making inlay grafts. It is adjustable, and can be employed to cut grafts of any desired uniform width, as well as the gutters for the inlays.

The angular saw is used in deep wounds.



Fig. 4. Skiagram of an ununited fracture of the tibia of four months' duration. This patient sustained two fractures of the fibula, one about three inches from its lower end and the other about three inches from the upper end. The fracture of the tibia was a three-fragment oblique fracture and was immediately Lane plated. a indicates the third fragment. Both of the two fractures of the fibula united and the plated tibia fracture did not unite. This skiagram shows considerable bone destruction both from the plate and the screws which have loosened and come out of the bone.

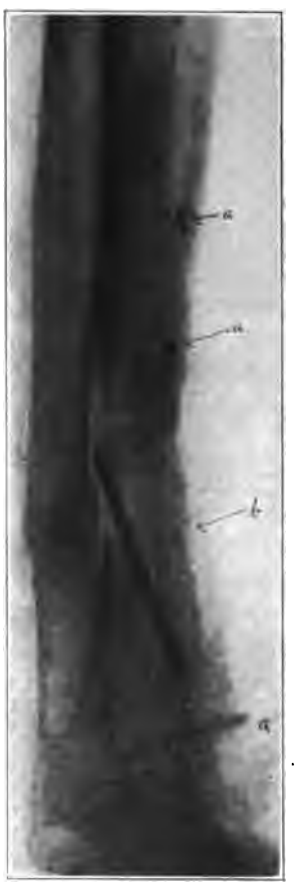


Fig. 5. Skiagram of the same case as Fig. 4, six weeks after the removal of the Lane's plate and a sliding inlay graft had been brought down from the upper fragment and firm union had resulted. a, a, a indicates the bone graft pegs which were used to fix in place the inlay (b). The pegs were made from the strip of bone removed from the lower fragment for the purpose of forming a gutter-bed for the sliding-inlay.

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The grafts must always have the most exact contact, and it is also very important to see that the graft is long enough to have ample contact with active bone beyond the sclerosed or infected area, as in the case of an ununited fracture or tubercular focus.

Through the influence of Wolff's law, a tibia whose diameter has been lessened by obtaining a bone graft from it will return to its normal size and strength in about two or three months; at the same time, the graft will likewise proliferate and become of a size and strength commensurate with

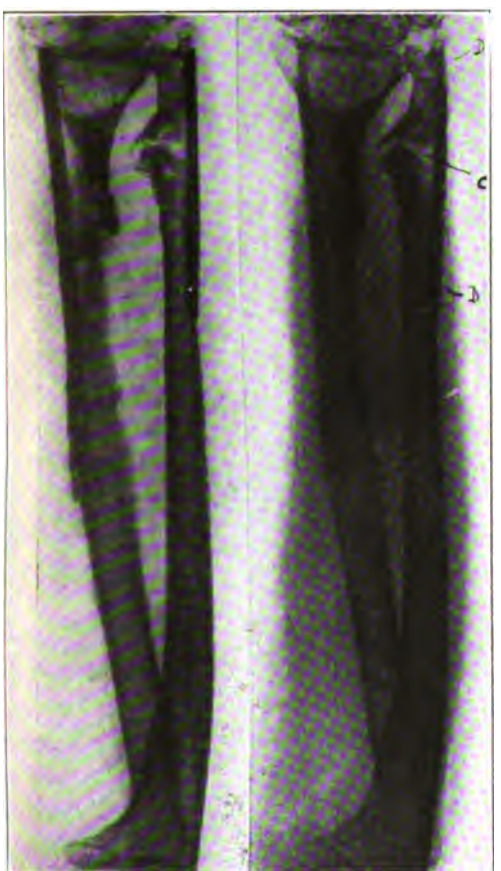


Fig. 6. Skiagrams of ununited fractures of the radius and ulna of four years' duration after seven unsuccessful open operations, to secure union, including Lane's plating, wiring and intramedullary bone grafting. The radiograms show the large holes and bone destruction, in both radius and ulna, which originated from the screws of the former Lane's plates and the metal contact of the plate itself. A is a skiagram taken five weeks after the successful implantation of tibial inlay grafts; B was taken six months after the operation and shows that the grafts have lost their sharpness of outline and are taking on the density and characteristics of the bone in which they are inserted. On account of the desperate nature of the case very long implants were used, and the wisdom of this is shown at C, where there is no union between the fragments or between the proximal fragment and the graft for a space of two-thirds of an inch from the end of the fragment, although there has been firm union for five months, because of the long graft coming in contact with the vascular-osteogenetic bone back of the sclerosed bone at the ends of the fragments.

the mechanical requirements of its new environment. In other words, it is a physiological hypertrophy.

In the application of the inlay graft to fractures of long bones, the skin incision, when possible, should be made to the side of the intended site of the transplant. The tissues are drawn back and the bone ends freshened. If the fracture is an ununited one and the fragments are in good apposition, most of the fibrous union is removed with a thin sharp osteotome. The peri-osseous structures are not disturbed, and the relationship of the fragment ends is left undisturbed in executing the inlay technic. This is important, because it produces a minimum amount of local trauma; and it is in this con-

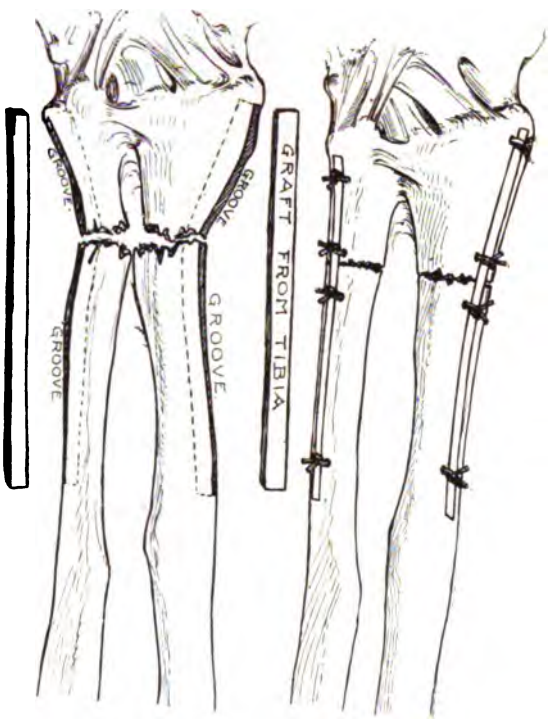


Fig. 7. Drawings illustrating the technic carried out in the case of which Fig. 6 are its skiagrams. A indicates grooves and grafts before insertion, and B after the insertion of graft and kangaroo tendon fixation sutures. The grafts were long and were placed into the radial side of the radius and the ulnar side of the ulna. The radial and ulnar fragments were very satisfactorily separated by drawing them to the grafts with kangaroo sutures as indicated in B. This is a special important feature of the inlay graft, as compared with that of the intra-medullary type, in its application to fractures of both bones of the leg or forearm.

nection that I wish to emphasize the pronounced inhibitory influence of severe trauma to cellular proliferation, and especially to osteogenesis. In no line of work is there greater danger of devitalizing trauma than in bone work, and this applies not only to the bone itself but to the surrounding soft tissues. A resultant infection of any of the involved tissue may interfere with a successful result.

Traumata may arise from the retraction of powerful muscles and their soft tissues, especially where

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a too short incision has been employed in the operative treatment of a fracture, from bone elevators or levers, from bone clamps, from the macerating and jarring effects of dull and blunt chisels, etc.



Fig. 8. A is a skiagram taken five weeks after an oblique fracture of the lower third of the femur with a considerable shortening, in a muscular individual. Two unsuccessful attempts had been made before I saw this case to hold these fragments with Lane's plates. f is a long fracture in the lower fragment which resulted from one of these previous operations. c, d in B is a graft obtained from the well tibia on account of the rarefaction of the bone in upper fragment. e, e are bone graft pegs, which were made from the strip of bone removed to produce the gutter in the upper fragment and were used to fix the inlay in its gutter (see Fig. 1). This case illustrates the peculiar efficacy of the inlay graft in holding difficult oblique fractures.

TECHNIC OF INLAY GRAFT FOR FRACTURES.

The periosteum is incised longitudinally and peeled back in the form of flaps to either side, exposing the bone which is to be removed for the purpose of forming a gutter in the fragment or fragments, as the case may be. If the inlay graft is to be obtained from the proximal fragment, the periosteum on this fragment is not disturbed, because it is always desirable that the graft include periosteum as well as endosteum and marrow sub-

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stance. In cases of delayed union, it is always preferable that the graft be obtained from the proximal fragment, on account of its having suffered less osteoporosis.

The inlay fragment may vary from four to six inches in length (never less), according to the size of the bone fractured, the extent of osteogenetic impairment, or the amount of comminution. If the comminution is extensive, or if the fracture is of long standing, resulting in an unusual amount of osteoporosis in the fragment ends, it is preferable to obtain a transplant from the healthy tibia, in which case the graft bed should be prepared first and packed with a hot saline compress, in order to secure a sufficient hemostasis.

Two parallel saw-cuts are made lengthwise in the fragment ends, extending through the complete thickness of the cortex and into the marrow cavity. The distance between the motor twin-saws is readily adjusted, according to the diameter of the bone and the point of fracture. The graft is then removed from the anterior-internal surface or crest of the tibia—from the crest or anterior-internal surface according to what strength is required—with the twin saws adjusted as they were in making the gutter. In this way an accurate fit is assured.

The cuts should extend two to three inches into the end of each fragment, if the transplant is to be obtained elsewhere (tibia), and should always pass far enough to reach well into active osteogenetic bone of each fragment. While the saws are cutting, they are constantly sprayed with saline solution supplied by squeezing a saline compress held over the saw, or by an automatic spray attachment supplied by a sterile tube from a douche bag suspended over the table. This prevents excessive heating of the bone from the frictional heat of the rapidly revolving saws.

The ends of the graft, as well as the strips of bone which, when removed, produce the gutter graft-beds, are cut across for purposes of removal with a circular saw so small that it does not encroach into the walls of the gutter.

If the graft is to be obtained from one of the fragments, the twin-saw cuts are made twice the distance into that fragment. The strip of bone thus obtained is slid endwise into the gutter in the other fragment. The fragments are fixed by holding the inlay firmly in place by heavy kangaroo tendon, or by bone graft pegs, as the case demands. The kangaroo tendon is used by drilling, with motor, the cortex on either side of the gutter. The tendon, two in each fragment, is threaded through from one side of the gutter to the other, and is then pulled up from the gutter in the form of loops under which the inlay graft is forced into place, and then the kangaroo tendon is tied over it. The bone removed in the form of saw-dust by the twin-saws causes the graft to be just enough smaller than the gutter to allow room for the kangaroo tendon.

If the bone is large and the problem of fixation is more difficult, bone graft pegs may be used exclusively, or may be supplemented by kangaroo tendon.

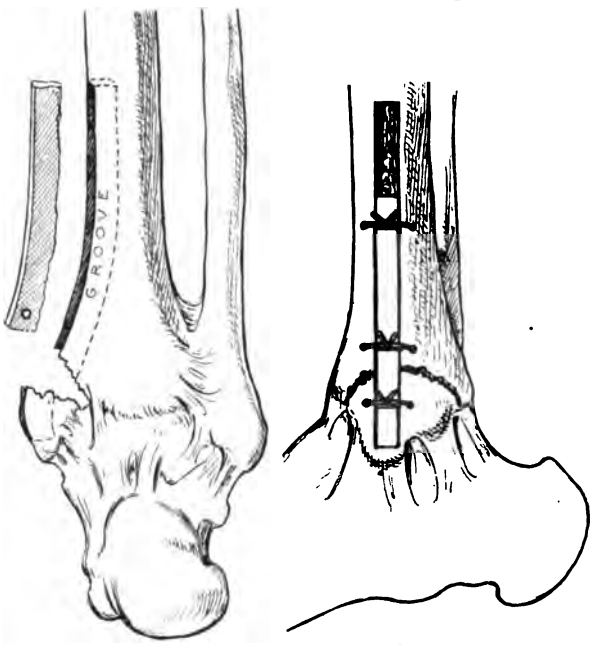


Fig. 9 are drawings to demonstrate the advantage of the author's inlay technic in fractures near joints. The inlay can be extended to the tip of the malleolus or the styloid process at the wrist, and if it unites to the proximal fragment, which can be made certain by a long contact, support of the joint is assured.

The bone-graft pegs are made by sawing longitudinally the piece of bone, removed for the purpose of producing the gutter, into two or three strips which are turned into dowel pegs by pushing them through my motor lathe. The inlay graft is held in place by clamps while, with the electric drill held obliquely over it, holes are drilled into the cortical bone of the sides of the gutter bed. The pegs, which always accurately fit on account of the drill which made the holes being of same diameter as the aperture of the dowel cutter, are forced into place by a few gentle blows of a mallet and are cut off with a motor saw close down, so that just enough projects to hold the inlay in place securely. The orig-

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inal dowel pegs are from two to three inches long, and will make from two to four fixation pegs. Small irregular graft-fragments are placed between the fracture fragments and around the inlay at that point where the fibrous union has been excised.

This technic allows of the most ideal co-adaptation of the graft to its bed. That is, every graft should consist of four different tissues, namely, periosteum, compact bone, endosteum, and marrow substance; and this technic is the only one which



Fig. 10. A is a skiagram of an infected, ununited fracture, six months after the insertion of two Lane's plates. The plates were removed a few weeks after their insertion. c, c indicates a sequestrum of the complete diameter of the tibia from the upper screw holes of the Lane's plate to the lower end of the upper fragment of which F is the photograph and g and h are the screw holes. B is a skiagram four months after the insertion of the graft. Bone union between fragments and graft was immediate, although there was a discharging sinus and a hiatus of two inches at the time of operation (see text).

By this technic, foreign bodies are entirely avoided. The material used is either wholly of autogenous bone grafts or partly of absorbable material. The fit of the inlay and the pegs must be accurate, because of the motor cutting tools used.

permits of the co-adaptation of each of these individual elements to those of the recipient bone. In three cases where there had been non-union and loss of bone following severe comminution or osteomyelitis, with death of the complete diameter of

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ends of the fragments after Lane plating, amputation or marked shortening was avoided by spanning these areas with long inlays. One could not wish better proof of the germ resisting property of the bone graft.

A and B, Fig. 10, are skiagrams of a case illustrating the usefulness of the inlay in infected ununited fractures. This case was that of a tibia, ununited and infected for six months. Two Lane's plates were applied immediately after the fracture, and on account of suppuration the plates had to be removed a few weeks later. c, c in A indicates a sequestrum of the complete diameter of the tibia



Fig. 11. Case of non-union of tibia of ten years' duration in a boy of eleven years. Two previous unsuccessful bone graft operations. Prompt union secured by author's inlay graft (see text). A is skiagram before operation and B after operation; b, b is the graft. (See text and drawing, Fig. 12, for technic of fixing graft into the conical end of the proximal fragment.)

from the upper screw-holes of the Lane's plate downward. This sequestrum was removed at my first operation. Eight weeks later the sinus had not healed, and as the patient was very anxious that something be done I cleaned out the bone cavity with curette, swabbed it with tincture of iodine and slid down an inlay (d, d, B) from the region (e). There was a hiatus of two inches from the death of the tibia which the graft spanned. On account of the large size of the sinus and the large amount of cicatrix it was impossible to cover a full inch of the central portion of the graft. In spite of the fact that part of the graft was bare and that it had been spanned through an attenuated pyogenic infected cavity, the wound healed kindly in a few weeks' time, granulations having covered in the graft. Prompt union of the graft to the tibial fragments occurred. B is a skiagram four months after the insertion of the graft, which has become so well amalgamated into the fragments that the graft can hardly be outlined. Wolff's law has caused the graft to hypertrophy, and the hiatus between the tibia fragments has been entirely filled in and the leg is as strong as it ever was.

This case has a very important bearing upon

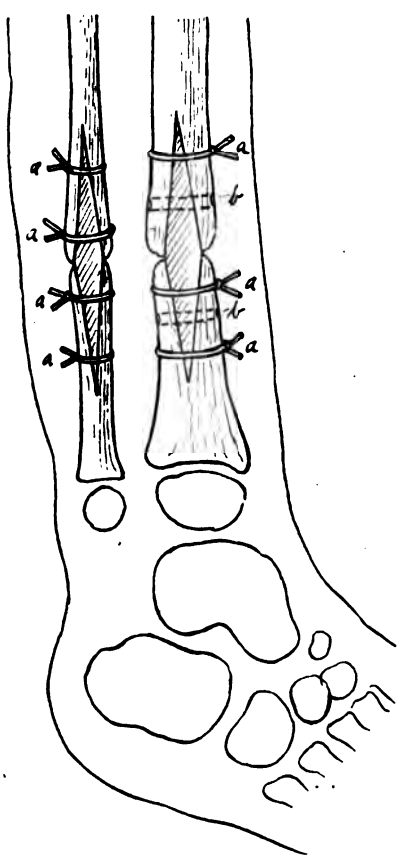


Fig. 12 is a drawing of author's modification of his inlay graft adapted to extremely atrophied fragments with marked conical ends. The ends are split with a motor saw and the resulting halves are wedged apart with the wedge ends of the grafts, which are molded into this form during their removal from the well tibia. a, a indicates the fixing kangaroo tendon which can be wrapped completely about the fragment-end or it may be placed in drill holes through both graft and fragment ends. b, b are bone graft pegs, which may or may not be used in large bones to supplement the tendon in fixing the graft in place. This drawing is from the skiagram of an actual case which on account of space will not be reported.

demonstrating the striking superiority of the bone graft as compared with internally inserted metal. The graft was inserted into a wound which, even at the time, showed evidence of macroscopic infection; nevertheless it healed in rapidly and has given no trouble since, although it is over one year since

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the operation. The surgical technic of inserting a metal plate must be of the most rigid and special type in order to avoid infection in clean cases, as pointed out by Lane, and if the slightest infection occurs it is very likely to extend the whole length of the plate and to its screws, and the plate must come out. In this case as well as several others the inlay graft was successful and resisted infection already present.

In view of these experiences the value of this method in fresh compound, comminuted fractures from gun-shot or other causes, mildly infected or not, is apparent.



Fig. 13. Skiagram of inlay bone graft (a, b) which has been bent and inserted into the spinous processes of the mid-dorsal region. Saw cuts which were extended two-thirds the way through the graft are shown at c, which allowed the graft to bend. Three vertebral bodies were crushed into the space (d, e) before the operation. The graft has prevented further crushing of the vertebral bodies and consequent increase of deformity. The case is a most satisfactory one, now two years after the operation.

Another case which illustrates the marked efficacy of the inlay graft is one referred to the author by Dr. W. W. Plummer, at a clinic held in Buffalo in March, 1914.

History of case: Boy, aged eleven years. In 1904, at the age of one year, both bones of the right leg were fractured, followed by complete non-union due to neglect. In 1906 an operation was done for non-union. An intramedullary graft obtained from the well leg was used. On account of bone atrophy the cortex of the tibial fragments had to be split longitudinally with a chisel. In nine weeks there was a very fair degree of rigidity. A few weeks later he refractured the tibia by falling and this fracture failed to unite. In 1909 another operation for non-union was done. This time, due to bone atrophy, the region of the bone ends was opened and several small pieces of bone taken from the well tibia, including periosteum and medulla, were introduced. This operation failed and the result was



Fig. 14. Photograph of a case of lower dorsal Pott's disease of the spine, into which a graft had been inserted one year before. The photograph shows the excellent functional result. a, b indicates the form of the graft showing through the skin as the body bends. No spinal supports were worn after the operation. A plea is made that all cases be operated early, as this case was, before the disease has extended to several vertebrae and an ugly kyphosis has resulted.

non-union. In March, 1914, I operated, using my motor bone outfit, and put in an inlay bone graft from the well tibia. The graft was fixed into the lower fragment by the usual inlay technic, but the lower end of the upper fragment proved to be so atrophied and conical shaped (see A, Fig. 11) that it was decided to split it with motor saw upward for about two inches. The upper end of the graft was shaped into a wedge at the time it was removed. This wedge end of graft was forced into the saw cut in the lower end of the upper fragment in the

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manner of a wedge (see Fig. 12, diagram of author's technic), and the lower end of graft was fixed into the lower fragment by the usual inlay technic. A plaster-of-Paris splint was applied which was removed early in June, 1914. Union was certain. Patient at present is walking on the leg, which is short from the old deformity. The union of the tibia is secure and the blood supply of the extremity is much improved.

This case of ten years of non-union is a striking illustration of the efficacy of the inlay autogenous graft.

In Pott's disease, the technic employed is very similar. The supra-spinous ligament is split by drawing the scalpel over the tips of the spinous processes. The knife is then passed deeper between the spinous processes and the inter-spinous ligaments are carefully divided into right and left halves without severing any of their fibers.

With the patient in the ventral position, a curved incision is made, and a flap of skin and subcutaneous tissue is turned up to expose the tips of the spinous processes. With a thin, broad, sharp chisel, or the author's osteotome, each spinous process is split longitudinally into as near equal parts as possible, care being taken that the spinous process halves are broken only on one side. These bone fragments, embedded in the corresponding half of the split ligaments, are then forced apart laterally, sufficient to produce a gutter into which the graft is placed. The depth to which the spinous processes are split varies with the size of the patient and the amount of pressure atrophy of the spinous processes from the pressure of the previous spinal supports. A hot saline compress is packed into the back wound while the graft is being obtained.

With the position of the patient undisturbed, the leg is flexed on the thigh and an incision over the tibia is made in the skin, not directly over whence the graft is to be taken. The subcutaneous tissues are separated from the periosteum. A pattern of the desired graft is then outlined in the periosteum with the point of a knife. The contour of the kyphosis is obtained by bending into the split tips of the spinous processes a flexible probe, which is used in transferring the pattern to the periosteum of the tibia. The motor saw affords a very rapid and exact method of shaping the graft at the same time that it is removed. The graft, which is taken from the crest of the tibia, varies in accordance with the number of the vertebrae into which it is to be inserted. It should span all the diseased vertebrae and two healthy ones above and below in the dorsal region, and one above and below when in the lumbar or cervical region. The graft, which should always include periosteum, endosteum, and marrow substance, is inserted between the halves of the interspinous ligaments and the spinous processes, with the saw-cut edge innermost and its cut or marrow side in contact with the unbroken halves of the processes.

When the deformity is so great that the tibia is not broad enough to furnish a molded graft of sufficient curve, then it is necessary that the graft be bent. This is accomplished by sawing the transplant on its marrow surface two-thirds to three-quarters the way through its cross section in numerous places about ⅛ to ¼ inch apart. The graft is then placed in its bed with its saw-cut edge in contact with the unbroken halves of the spinous processes, and its marrow or nicked surface anteriorly. (See Fig. 13.) The supraspinous and interspinous ligaments are drawn over it posteriorly with interrupted sutures of heavy kangaroo tendon, while it is bent into place by pressure from some instrument. If the saw nicks are placed carefully with a thin saw, adult bone can be bent over the most pronounced kyphosis without breaking. This has been repeatedly accomplished by the author. If the saw is too thick, it allows too much bending at each individual nick, and the bone breaks.

The intact periosteum over the convex surface of these grafts is a potent fact in preventing breaking (see Fig. 13). Small, irregular grafts are placed around each end of the transplant, because of their active osteogenesis.

The postoperative treatment is close confinement of the patient in the dorsal position on a firm fracture bed for not less than six weeks. After this, the patient is allowed to walk about for a part of the day, and should live a life suitable for tubercular patients for many months after the operation. A strong plea is made for the operation to be done early in the course of the disease, and if it is done before the development of a large deformity, a plaster jacket or spinal support is not necessary after operation. The patient should be kept under careful observation throughout the entire convalescence. The immediate relief of pain and acute symptoms after the operation is most satisfactory.

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The bone graft treatment is indicated at all ages and in every case of vertebral tuberculosis where pain or muscle spasm demands support or immobilization, and the earlier the operation the more favorable the prognosis. It is, however, all the more indicated in the presence of complications, such as psoas abscess, cold abscess, or paraplegia.

It is a fortunate circumstance in the application of this treatment to young children, where the tips of the spinous processes are cartilaginous, that broken or incised cartilage unites by bony union and that a bone graft inserted into cartilage influences it to change to bone. This statement has been confirmed in several surgical cases.

The special advantages of the operation may be classified under four headings:

1. Immediate bony or complete fixation of the diseased vertebrae is produced—something which cannot be attained by any external means on account of constant respiratory motion.

2. Prevention of further progress of deformity.

3. Correction of a kyphosis of short duration in children at operation, or the remote lessening of the kyphosis by growth of the spine with the graft in place.

4. The treatment does not involve a long-continued compression of the thorax nor interfere with bodily or respiratory functions.

The following case is illustrative of the efficiency of the bone graft and also of the slight amount of shock produced by the operation, when done with the aid of proper motor tools. The child in question was a delicate girl of four years of age, whose mother had been informed at a dispensary that it was necessary that her child be placed on a gas pipe frame for not less than two years, followed by plaster-of-Paris jackets for at least two and one-half years. She was suffering from acute tuberculous vertebral disease in the upper lumbar region and had been on the frame for nine weeks, with only a partial relief of symptoms in that time. The mother came to me much disturbed over the fact that if the conservative treatment was to be continued the child would not be able to take a step or stand on her feet for two years. The child was admitted to the hospital, and it was planned to operate upon the case before the Congress of Surgeons of North America, in November, 1912, for the purpose of demonstrating my bone graft operation for vertebral Pott's disease. But because of high temperature, which it was feared might be due to some complicating infectious condition, and the frail condition of the child, the operation was postponed. After determining that there was no other cause for the temperature than the acute vertebral tuberculosis we operated the middle of the next week, although the temperature remained about the same. The operation was done in twenty minutes, and the child suffered no shock from it, and the immediate convalescence was uneventful. It has been two years last November since this case was operated on. The child was fixed to a fracture mattress for a period of six weeks following the operation, and since then no plaster casts or spinal braces have been used. The mother has had her at home under a fairly favorable regime of life for a child suffering with tuberculosis. The symptoms were relieved from the time of operation and the child is in perfect health. The flexibility and function of the spine is normal, with the exception of the few vertebrae held by the graft.

40 East Forty-first St.

DISEASES OF THE THYROID GLAND WITH SPECIAL REFERENCE TO THE SURGICAL ASPECT.*

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The two principal objects the writer has in view in presenting this paper are:

(1) To stimulate thought and investigation, especially clinical, and

(2) To call attention to a method of treating hyperthyroidism which is capable of materially improving the results hitherto obtained.

It is pretty generally accepted now that there is but one "anlage" from which the thyroid gland is developed. This "anlage" is situated between the three portions of the tongue and subsequently descends to its normal place in front of the upper rings of the trachea. In the descent the thyroglossal duct is formed. The duct may persist, or the descent of the gland may be imperfectly accomplished. The descent of the gland may be continued below the normal limit. These errors in development serve to explain lingual

* Read by invitation at the meeting of the Wayne County Medical Society in Detroit, Mich., January 4, 1915.

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thyroids, pretracheal cysts and so-called diving thyroids. In some of the higher invertebrates the thyroid is developed in connection with and delivers its secretion, through a duct, into the genital tract. This embryologic fact adds emphasis to the generally accepted view that the thyroid is intimately associated with the sexual system.

Women in the bearing and rearing of children are called upon to expend more energy in a sexual direction than are men and they are five times more prone to thyroid diseases than men are.

Kocher and Trachowsky[1] have shown that the removal of the thyroid from pregnant animals causes them to give birth to rachitic young.

Absence of the thyroid is incompatible with life, and a normally functionating thyroid is necessary to health. Congenital absence of the thyroid means arrested development and ultimate death, while complete destruction of the thyroid in the adult leads to pathologic changes and disturbances of function in hitherto normal tissues and organs. Not only is a normal thyroid necessary to the development of the child, but the development of the child in embryo depends in no small measure upon a properly functionating thyroid in the mother. Hyperthyroidism is a not infrequent cause of premature separation of the placenta and death of the child. There is abundant clinical evidence to show that a more or less vigorous thyroid activity is necessary to the prevention of serious toxemia in the pregnant woman, and that such vigorous activity safeguards her against infection. The paramount importance of the thyroid in the human economy is perhaps best illustrated by its blood supply which in proportion to its weight is twenty-eight times greater than the head and five and one-half times greater than the kidney. It is estimated that all the blood in the body can pass through the thyroid gland in an hour or less time. It is interesting to note that it is the only vital organ in the body unprotected by bony walls. The lymphatics of the thyroid probably open directly into the veins in the substance of the gland, as well as into the lymph nodes of the neck. The posterior capsule is relatively dense and firm and holds the gland in close connection with the trachea. Normally the recurrent laryngeal nerves and parathyroid glands are situated posterior to the capsule, so that in the operation of thyroidectomy injury to these structures may be avoided by preserving intact the posterior capsule. The nerve supply of the thyroid is probably entirely from the sympathetic system. The muscles of Landström and Müller, which are the antagonists of the recti muscles of the eye, also receive their nerve supply from the sympathetic system. This probably accounts for the salutary effect of the removal of the sympathetic ganglia in exophthalmos.

The normal thyroid is capable of furnishing perhaps five or six times the amount of secretion needed under ordinary circumstances. A certain amount of increased activity of the gland, quite commonly accompanied by increase in size, is perhaps normal at puberty, during menstruation and pregnancy, while in the later years of life relative inactivity is the rule. Broadly speaking, increase in the size of the gland is not necessarily coincident with symptoms of hyperactivity. Indeed the average degree of enlargement is greater in hypo- than in hyperthyroidism. The histologic picture of the hyperactive gland is hyperplasia, but, as indicated above, this may be unaccompanied by any appreciable enlargement of the gland. The truth probably is that the essential nature of hyperthyroidism or thyrotoxicosis consists of an increased or perverted function rather than an increase in the number of functionating cells. In the examination of a large number of specimens and cases, Plummer has never found a case of exophthalmos where there was absence of hyperplasia in the gland. Many of the symptoms of hyperthyroidism, especially such as pertain to the cardiovascular system, are found in glands that are undergoing degeneration, cytolysis, but glands of this sort without hyperplasia never give rise to exophthalmos. It is necessary to continually bear in mind the intimate relationship between all the ductless glands. There is much clinical evidence and some postmortem evidence in support of the theory that no one of the ductless glands is ever seriously deranged without involvement of the others. Moreover this interrelationship makes it possible that a given group of symptoms, depending apparently upon disfunction, say of the thyroid, may have their origin in a pathologic change in some other one of the ductless glands. This relationship ex-

[1] Annals of Surgery, Vol. 24, p. 99, Abs.

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plains the cure of hyperthyroidism following the removal of the tuberculous female appendages. Robert T. Frank, of New York,[2] speaking of the interrelationship of the ductless glands, says:

"Dissociation of their interrelation or disturbance of mutual balance suffices to produce variations from the normal. Therefore, symptoms produced by disease, or by deliberate injury or removal of a given gland, may manifest themselves by phenomena ascribable to one or more distant members of the chain; likewise, response to therapeutic measures, though apparently the direct result of effects produced upon a certain gland, may really prove to be due to mediate action through other members of the group."

If one constantly bears in mind this interrelationship, it will help him materially, especially with the aid of well-known therapeutic tests, both in the diagnosis and treatment of many obscure cases. It might be well here to emphasize the fact that the whole subject of the ductless glands is as yet in large measure a closed book, and it behooves us, therefore, to move with care and caution and not to be too hasty in drawing conclusions. I would like on this occasion also to again call attention to the importance of careful and painstaking clinical observation as an aid to the elucidation of the whole subject of the ductless glands.

Hyperfunction of the thyroid frequently manifests itself rather abruptly, and not infrequently the symptoms subside with equal abruptness. Not infrequently in these cases we are at a loss to account for either the onset or the subsidence of the trouble. The careful clinician will be very careful, therefore, in arriving at conclusions concerning the efficacy of therapeutic measures, on the one hand, or the importance of alleged or apparent etiologic factors, on the other.

There is much evidence to support the theory of Rogers and others that the various symptoms of goiter, whether they be those of hyperactivity or those of hypoactivity, or a combination of the two, are but manifestations of different stages or combination of stages of the same disease process.

Personally, I am inclined to believe that all permanent goiters should be regarded as potentially toxic and treated accordingly. If all so-called simple goiters were removed the result would be a lessened morbidity and mortality from thyrotoxicosis.

Whatever differences of opinion there may be on other points all are agreed that persisting thyroid intoxication leads ultimately to serious and possibly fatal cardiovascular and other changes. and that success in the treatment depends in large measure upon its being instituted before these changes become serious.

Degeneration of the muscles of Landström and Müller means permanent exophthalmos, and degeneration of the cardiac musculature means a permanently damaged circulation. I venture the opinion that in the near future there will be developed a surgical field in certain psychoses associated with goiter. The following is a case in point:

Case 1. A young unmarried woman below normal in size and rather poorly nourished was referred to me with a view to relief from melancholia accompanied by delusions through the removal of a small goiter. She had a mild tachycardia and slight tremor, but no other symptoms of hyperthyroidism save a feeling of muscular weakness. A painstaking examination and study of the case with the aid of the family physician (Dr. Metts of Bluffton) and Dr. G. W. McCaskey failed to reveal any physical changes save those noted, and resulted in the patient being advised to have a thyroidectomy done. She consented, and following the operation there occurred a rapid improvement, which continued until the recovery seemed complete and has remained so up to the present writing, six months.

While it would be rash to assert that the above case is convincing, I submit that it is sufficiently suggestive to warrant further careful work along the same line. It is hoped that ere long there may be developed a successful method of thyroid grafting.

There is every reason for believing that we could permanently cure many otherwise hopeless cases of hypothyroidism could we successfully graft the thyroid.

Neoplasms and infections of the thyroid are rare, and neoplasms and infections in otherwise normal thyroids almost unknown. Personally I have met with a very few cases of sarcoma, carcinoma and infection in the thyroid, but in all

[2] Surgery, Gynecology and Obstetrics, November, 1914, p. 618.

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there was a preexisting goiter. Sudden increase in size of a simple goiter should arouse a strong suspicion of malignancy. It is worthy of note that, contrary to the rule, sarcomas of the thyroid, unlike sarcomas in general, are peculiarly prone to dissemination through the lymphatics. Any tumor of the thyroid may be the cause of symptoms of hyperthyroidism. It is not an uncommon thing to meet with cysts of the thyroid accompanied by symptoms of hyperthyroidism, which cases are completely cured by removal of the cysts. A priori it would seem probable that all adenomas and carcinomas would cause symptoms of hyperthyroidism, and that sarcomas would, especially if infiltrating, produce symptoms of hypothyroidism, and my own quite limited experience lends color to this view. Just how small innocent tumors, not epithelial in character, cause symptoms of thyroid intoxication is not definitely known, but it is perhaps generally conceded that their presence acts as an irritant to the gland.

Concerning the surgery of the thyroid I shall confine my remarks chiefly to hyperthyroidism, but should like to repeat here what was said in an earlier part of the paper and emphasize it, viz., all so-called simple goiters that are persistent should be looked upon as being dangerous and should be removed. As with cancer so it is with hyperthyroidism—the best time to cure it is before you have it. Thyrotoxicosis is much more likely to be engrafted upon a simple goiter than cancer upon a wart, a mole or a lacerated cervix.

All are agreed upon the wisdom of removing pre-cancerous conditions, and to me it seems that the wisdom of removing simple goiters is quite as evident.

Given a case of hyperthyroidism in a patient who is a good surgical risk and there can be no question but that the best treatment is partial thyroidectomy. Especially is this true if the thyroid is large enough to produce deformity.

Cases such as the above with very slight thyroid enlargement, and especially if the enlargement is circumscribed, may be cured by the injection of boiling water into the gland. If there be but slight or no enlargement it is better to uncover the gland by a small incision and make the injection under guidance of the eye.

The boiling water is especially recommended as a preliminary treatment in cases where thyroidectomy would be hazardous.

In comparing the boiling water injections with the rest treatment or the ligature I can do no better than to quote the words of Dr. Wayne Babcock,[3] who for the past year has prepared all of his patients with intense hyperthyroidism for operation by injecting boiling water. He says: "It is my opinion that in this way one may accomplish as much in a week as by putting the patient to bed for six weeks to three months. There is no question that the injection produces a more intense effect than a double ligation."

Not infrequently patients thus treated require no further treatment. Boiling water injections into a goiter markedly reduce the size of the gland; indeed a large goiter has been made to disappear entirely,[4] in the dog, by this method, but it is not advised in the treatment of simple, non-active goiter for reasons that are apparent.

I will close this paper with the conclusions to my article on this same subject published in the January number of *Surgery, Gynecology and Obstetrics.*

1. Injections of boiling water into the gland should be substituted for the so-called medical treatment in patients with small thyroids and moderate symptoms of hyperthyroidism.

2. This method is also peculiarly well adapted to the treatment of patients with moderate or severe symptoms and relatively small glands, and especially to cases wherein the hyperplasia is circumscribed. It is therefore well adapted to the treatment of patients who have had a lobectomy done and are still suffering from symptoms of hyperthyroidism with hypertrophy of the remaining lobe.

3. Patients with large goiters and extreme symptoms of hyperthyroidism should be treated with the injections until they become safe surgical risks and then have the gland removed.

4. Boiling water injections are not recommended in non-toxic goiter. In such cases, as in patients with large goiters and toxic symptoms but who are good surgical risks, thyroidectomy should be the chosen method of treatment.

5. In substernal hyperactive goiters, the removal of which would be hazardous, boiling water injections under guidance of the eye should be tried.

[3] Surgery, Gynecology and Obstetrics, January, 1915, p. 8.

[4] Journal A. M. A., 1913, LXI., p. 98.

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PROSTATECTOMY.

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Much has been written regarding prostatectomy, particularly concerning the operative technic. Some writers have advocated the supra-pubic approach, others the infra-pubic. Some surgeons suggest that the operation be done in two stages as a routine, others that it should be completed at one sitting. Some authorities have written much about preliminary treatment, others pay little attention to pre-operative technic, submitting the patient to immediate operation. Some surgeons think that the patient should have little or no post-operative treatment, while others suggest that this is of paramount importance in obtaining the best end-results.

Early diagnosis is essential for the best results. Do not waste time with palliative treatment, as nothing other than surgery will be followed by good results.

The earlier the diagnosis is made the better for the patient.

Nocturnal frequency, retention and residual urine are the cardinal points in diagnosis.

An estimation of the functional capacity of the kidneys is important before resorting to surgery. A course of preliminary treatment is eminently essential if the renal functional capacity is lowered or there is any septic involvement of the bladder. The general health of the patient will be impaired without question if these conditions are evident. The phenolsulphone-phthalein test is the most valuable for the estimation of the renal function.

If there is much residual urine or a septic condition is present, preliminary treatment for a longer or shorter time is advisable, consisting in lavage of the bladder twice daily, so that viscus may be kept clean and free from distention, thus relieving the septic state and taking the strain from the kidneys. Good food and tonics are necessary. Just as soon as the kidneys show improvement from the standpoint of increased functional capacity and the urine becomes free from pus, then operative interference is indicated.

The use of the cystoscope will give valuable knowledge as to the condition of the enlargement, the length of the urethra, the condition of the bladder, and whether or not calculi are present. A cystoscopic examination should be made in every case as a matter of routine.

From the findings of the cystoscopic examinations we should outline our operative procedure.

The supra-pubic method should be practiced where the prostate is markedly enlarged and protrudes well into the bladder cavity; where the urethra is markedly elongated, making a deep perineum; or where there is a calculus in the bladder. Perfect drainage can be accomplished by either method, so that this feature need not be taken into consideration.

The infra-pubic or perineal approach should be employed where the prostate is small and situated low down; where the urethra is not elongated markedly, and where there is a shallow perineum. In very fat patients with small bladders, where the abdominal fat and tissue are thick, the perineal approach usually is preferable.

Personally I do not like the two-step operation as a routine procedure, but occasionally it is necessary. You can do about as much good by careful catheterization with lavage of the bladder as you can by opening the bladder for drainage.

Shock is the dangerous element in prostatectomy. It may be aborted by careful attention to operative technic. The anesthesia is important. Nitrous-oxide-oxygen given by an expert is ideal. Ether is safe in the hands of an anesthetist of experience.

The operative procedure should be as short as possible. All of the preparatory technic, such as the preparation of the operative field and irrigation and filling of the bladder, should be carried out prior to beginning the administration of the anesthetic.

Rapidity of operation is the key-note to success, as a prolonged operation increases the shock.

Drainage is important and must be perfect in its action to obtain the best results.

The author's drainage apparatus produces perfect drainage, thus preventing hemorrhage and sepsis and promoting more rapid convalescence.

After the patient is placed in bed the tubing is connected with the drainage tube from the bladder. The Y-shaped tube, F, must be below the level of the patient lying in bed, the reservoir, A, filled with water, the stop-cock, B, turned so that the water will drop slowly into the cup, C, which, on being filled, tilts and empties itself into the funnel, D.

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The water running down the long tube, E, into the Y-shaped tube, F, forms behind it a suction which causes a siphonage of the fluid in the bladder. This siphonage may be regulated to occur at any given interval by arranging the flow of water from the stop-cock, B, which flows into the cup.

I am sure that those who are doing much bladder work have met with the same difficulties in perfect drainage as I have in my work, and that if they will use the apparatus devised by me they will be satisfied with the results.

By perfect drainage you render your patient comfortable; the bladder does not become distended, clots cannot form, the dressings are dry; the bladder cannot fill up, the urine cannot wet the dressings, thus irritating the wound and preventing



healing, and cannot trickle into the tissue of the prevesical space and engender sepsis. I have used this apparatus in a large number of cases, and feel, without doubt, that my satisfactory results have been due almost entirely to perfect drainage.

These old patients should be gotten out of bed as soon as possible.

Have them sitting up in bed during the second twenty-four hours and in a chair by the third day and walking around the fifth or sixth day.

To my mind the post-operative treatment is all-important. Twenty-four hours after operation we begin lavage of the bladder by means of a metal catheter about 20 F. This is done daily, increasing the sizes of the catheter one number each day.

The drainage tubes are removed about the fifth day.

The drainage tube is brought out of the upper angle of the wound in supra-pubic incisions, preventing leakage into the prevesical space, and if drainage is perfect the wound will heal by primary union up to the tube.

In perineum work the tube should come out the superior angle of the wound, thus preventing leakage into the perineal tissues.

To summarize:

Make the diagnosis early—then early operation is possible.

Don't operate too soon in old cases where bladder and kidneys are involved.

Don't waste time on your operative procedure.

Remember that preliminary treatment must be resorted to where there is a persistent cystitis.

Don't forget that much may be accomplished in the pre-operative treatment by persistent and careful catheterization with lavage.

Don't forget that perfect drainage is essential.

Remember that carefully planned post-operative treatment will shorten convalescence and give the best results.

Remember that cystoscopic findings must be the means by which we decide the method of operation.

Remember that rapid and careful operation in this class of cases will increase the good results and cut down mortality.

104 So. Michigan Ave.

Traumatic Aneurisms.—In cases of traumatic aneurysms during the present war Prof. A. Bier (*Deut. med. Wochensch.*, No. 5 and 6, 1915) has seen the best results from arterial suture, which he considers the method of the future. Unless the surgeon is familiar with the technic, however, he should not resort to this operation, especially in arteriovenous aneurysms. Even those who oppose arterial suture on general principles should employ it in the lower extremities where the danger of gangrene from occlusion of the artery is considerable. If ligation is performed, the extirpation of the sac should be omitted, which interferes materially with the collateral circulation. As infection greatly jeopardizes the success of operations for aneurysms it is advisable to wait until more aseptic conditions can be established unless this is prevented by hemorrhage. If the wall of the artery has been extensively injured resection of the damaged portion may have to be performed.

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THROMBOSIS OF THE SIGMOID SINUS.*

By ERNEST DANZIGER, M.D., New York.

Adjutant Professor of Otology, Fordham University, etc.

The sigmoid sinus is the large venous sinus located in the mastoid process of the temporal bone. It runs behind the posterior lower wall of the antrum, covered by spongy bone, and curves downward and inward underneath the tympanic cavity, where it forms the jugular bulb and is continued through the jugular foramen as the internal jugular vein. The upper end of the sinus forms a knee and runs backward toward the torcular. Into the sinus empty above, the superior petrosal; below, the inferior petrosal sinus; in the middle, the vena emmissaria. The sinus wall is formed by two layers of dura mater.

Being in close connection with the middle ear, antrum and mastoid cells, it becomes occasionally involved in affections of these structures. There are three different ways by which infection may be carried to the sinus—

(1) During an infection of the middle ear a thrombophlebitis of the osseous veins may extend into the sinus.

(2) In disease of the bone the process may involve the sinus by direct extension.

(3) Traumatism during the performance of the simple mastoid operation.

In connection with the last mode of infection the experimental studies of L. Hayman may be of interest (*A. F. O.*, Vol. 83). He shows in his experiments on dogs that:

1. Compression of the sinus by a sterile tampon of gauze will not produce thrombosis.

2. Slight traumatism to the sinus wall followed by compression with a sterile tampon does not produce thrombosis.

3. In the presence of bacteremia a trauma to the sinus followed by compression will produce thrombosis.

4. Prolonged compression of a normal sinus with a tampon soaked in a culture of pyogenic cocci will eventually produce thrombosis.

5. Trauma of the sinus followed by compression with an infected tampon will also produce a thrombus.

We see therefore the reason why an injury to the sinus under aseptic conditions is not of great danger to the patient. When some operators report a number of thrombosis cases following traumatism during simple mastoid operations, these were in all likelihood instances of bacteremia (Dr. Scruton).

The thrombosis begins with an inflammation of the sinus wall, which is followed by the formation of a parietal thrombus at the diseased area. The thrombus gradually fills the lumen and extends backward toward the torcular and downward toward the bulb, which may become involved, and the thrombus may even extend into the internal jugular vein.

The thrombus may contain bacteria from the start or be invaded later. When it breaks down, particles are carried into the blood stream and metastatic abscesses are formed all over the body.

The pathological process in the middle ear giving rise to this dangerous complication may be so mild as to cause only a few transient symptoms, or may be so severe as to produce a breaking down of the mastoid bone.

Recently Oppenheimer has reported a number of cases of multiple arthritic disease treated for some time as articular rheumatism, which gave a positive blood culture showing colonies of streptococci. At close investigation a history of inflammation of the middle ear was elicited. This either had caused very little symptoms or had practically subsided. A mastoid operation showed a thrombosis of the sigmoid sinus.

During the course of an acute inflammation of the middle ear or mastoid process and during the postoperative treatment this complication should be easily recognized. There will be a sudden rise of temperature to above 105, which just as suddenly will be followed by a drop to almost normal within twenty-four to thirty-six hours. A chill will drive the temperature up again, and a typical pyemic curve will be established. The patient rarely complains of headache; his sensorium is free as a rule, and he shows the euphoria of sepsis.

A differential blood count will reveal a hyperleucocytosis and an increase of the multinuclear leucocytes to above 85 per cent. In case of a low resistance the blood count may show almost normal proportions. A blood culture in the beginning is often positive, in the later stages always so. In postoperative cases the symptoms are not always so typical.

After the performance of the simple mastoid operation the temperature may remain high, ranging

* Read before the Yorkville Medical Society, February 15, 1915.

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between 102 to 104. No chills or sweats may occur. Whenever a temperature of this type persists after the fourth day following operation, other causes being absent, the sinus ought to be exposed freely and incised.

Different in character and clinically more difficult to recognize is the picture of a thrombosis of the sigmoid sinus complicating chronic middle ear suppuration. It is not at all unusual to see cases of thrombosis of the sigmoid sinus treated for paratyphoid, kryptogenetic sepsis, articular rheumatism and even acute leucemia, and so on. The reason for this mistake is easily explained. In the presence of a chronic suppuration of the middle ear, to which the patient has been accustomed for years—sometimes for his whole life—he does not inform the physician of such condition, therefore the medical practitioner, who does not make routine examinations of the ear, is easily misled.

Through the persistence of Dr. E. Libman, in conjunction with the otological staff of the Mt. Sinai Hospital, the attention of the profession at large has been called to the fact that the ear may be the offending organ in cases of unexplainable sepsis.

Dr. Libman takes the following stand: In cases of sepsis of unknown origin in the presence of a positive blood culture and some recent or chronic ear affection, explore the sinus sigmoideus. I believe that through these efforts quite a few lives have been saved.

The purpose of the operation for sinus thrombosis is the elimination of the whole venous channel from the circulation; therefore we should follow it back far enough to compress the superior petrosal sinus and down far enough to compress the inferior petrosal sinus. Before opening the sinus, the internal jugular vein should be ligated above the entrance of the facial vein. Only if the jugular vein itself is thrombosed should it be resected, as the vein wall might be infected and keep up the pyemia.

Whether the ligation of a healthy jugular vein really excludes the sinus from the general circulation seems extremely doubtful, as we get bleeding from below even after the most extensive exposure of the sinus and jugular ligation.

Let me illustrate my description by a few cases:

Case 1. R. S., boy nine years of age, while recovering from an attack of grippe and tonsillitis, developed, November 19, pain in his right ear. Paracentesis November 20. The temperature gradually became normal. The ear was discharging freely a thin sero-pus, which after a few weeks became a little more stringy. On December 12, the ear became painful to the slightest pressure, and he developed a fever ranging from 100 to 103. As the symptoms did not improve under use of an icebag and the suction syringe (Prince Fowler), combining the Bier treatment with the irrigation, the simple mastoid operation was performed by me on December 18. No free pus was found. The antrum contained large granulations; the bone was very soft and bled freely. Bone was removed until the osteitic area was eliminated, and the wound sutured, with a gauze drain from the auditus and antrum through the lower wound angle. The temperature became practically normal in four days, when the drain was removed, and after a week the sutures were removed. The wound practically healed per primam.

Two weeks after operation boy was taken to Stamford, where he had a chill the same afternoon, his temperature going up to 106. Examination the same night showed the middle ear dry and no retention in the mastoidal scar. The blood count was normal. The temperature fell to 101 within twelve hours, then rose to 104, and again went down to normal. After thirty-six hours he had another chill with a temperature of 106. In the absence of any other symptoms the diagnosis of thrombosis of the sigmoid sinus was made. The same afternoon the sinus was exposed. Far back toward the torcular a discoloration of the sinus was discovered. The internal jugular vein was ligated and the sinus split from knee to knee, bleeding from below.

This is a case of sinus phlebitis with a parietal thrombus. After the operation the temperature never went up above 101 and is now normal.

Case 2. Clara F., forty-eight years of age, widow, had an attack of grippe December 2, 1911. Four days later she complained of pain in her right ear. December 26, I saw her for the first time and found her suffering from an acute right middle ear inflammation. There was a blood bleb on the drum. Paracentesis was performed immediately. January 7, 1912, twelve days later, she presented herself at my office with a temperature of 101.5 and a history of two chills within the last three days. There was intense pain on pressure over the antrum and tip of the mastoid and a profuse discharge of bone pus.

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January 8, simple mastoid operation was performed at the Har Moriah Hospital, which disclosed an acute osteitis, the bone bleeding profusely. No free pus was found in the antrum or cells. January 9, the temperature ranged around 100. On the evening of January 10, she had a chill, and the temperature rose to 105.2. A blood culture was taken at once and showed after thirty-six hours colonies of streptococci. Differential blood count: 22,000 whites, 87 per cent. of polynuclear leucocytes.

January 12, exposure of the sinus from knee to knee. Careful incision of the bulbar end resulted in free bleeding from below. No bleeding from above, where the sinus was of dirty greyish color. Exposure of the sinus further back until it looked normal. Splitting of the sinus was followed by a sudden gush of blood. The jugular vein was found not thrombosed and ligated below the facial on account of a number of enlarged glands. The next day the face on the side of the ligation was cyanotic and edematous. There was a slight exophthalmos on that side. Patient was rather restless and not quite rational. January 14, the temperature went up to 105. Blood culture still positive. Differential blood count: 20,000 whites, 75 per cent. polynuclears. The dressing was removed and the neck wound found clean; the incision in the sinus wall had closed. In attempting to reopen it, free hemorrhage occurred from both ends. January 16, the temperature rose only to 103. January 17, temperature practically normal. Patient discharged well after two months. Cyanosis and exophthalmos have disappeared.

Case 3. Male, thirty-seven years of age, about November 15, 1910, underwent an intranasal operation. Two days later he had pain in the left ear. A day after the appearance of the pain paracentesis was done. On December 3, he was apparently well, with only a moderate amount of pus discharging from the ear. December 4, the temperature rose to 104. He complained of headache on the left side. No spontaneous nystagmus; no opistotonos or Kernig; no tenderness over the mastoid. There was perforation in the lower posterior quadrant of the drum, through which a slight discharge of pus, not under pressure, could be seen. No sinking of the upper posterior meatal wall was present. December 6, a differential blood count showed 15,800 whites, 90 per cent. polynuclears. Temperature, 100½ morning, 102¾ at 3 p. m. December 7, pain was felt in the right knee. Temperature up to 106. Mastoid operation at 4 p. m. Sinus exposed and appeared normal. As a strong probability of a parietal thrombus existed, it was incised, free bleeding resulting. December 9, temperature 99½ to 101. December 13, aspiration of the knee-joint by Dr. A. Moskowitz showed pus containing streptococci. Temperature up to 104. Patient continued in the same condition up to December 21. A blood culture at that time showed streptococci. He developed a metastasis in the right scapular region. The sinus was now exposed almost down to the bulb. There was still bleeding from the torcular end. After removal of a blood clot from below some purulent material exuded from the region of the bulb. I ligated the internal jugular vein, which was not thrombosed. In spite of my efforts, the patient's general condition remained unchanged. On December 24, I lifted the upper end of the ligated vein into the wound and introduced a soft rubber drain into the vein. The same was done from above. Pushing a soft rubber drain into the sinus through this drain, I succeeded in flushing the bulb from above. December 28, blood culture still positive. The mastoid wound and sinus looked well. The knee-joint was aspirated again, and two ounces of pus were demoved. December 29, patient became delirious and died.

Whether it is a coincidence or not, the fact remains that all of my cases of sinus thrombosis showed an osteitis without formation of free pus.

OUR NEW SERIES ON DISEASES OF THE NOSE, THROAT AND EAR.

In this issue we present the first of a series of articles on Diseases of the Nose, Throat and Ear, by Dr. James J. King, of New York. No attempt will be made by the author to cover the entire field, but rather to discuss those conditions which are most frequently encountered by the general practitioner. The chief aim will be to make these articles thoroughly practical and therefore as helpful as possible from a diagnostic and therapeutic point of view. Dr. King brings to his task a wide clinical experience, and thus much of what he will say on the subject of treatment will be based upon his personal observations. The reader will not be bewildered by a multitude of methods, as in so many text-books, but only those will be described which, according to the author's experience, have proved most reliable. It is hardly necessary to add that these articles will be up to date, and hence represent a valuable course of post-graduate instruction.

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Editorial Department

NEW YORK, MARCH, 1915

TRANSPORT AND CARE OF THE WOUNDED IN WAR.

In most of its phases the present war in Europe has had no parallel in history. This statement especially applies to the care and transport of the wounded. The Germans, who were prepared for war in every particular, had a splendidly organized army medical service equipped in accordance with the latest developments of military strategy and adapted for the existing conditions.

The British and French, on the other hand, were notoriously unready for war and, consequently, their army medical corps practically had to be organized after the commencement of hostilities. At any rate, this was the case with the British army, for although its medical corps was fairly well organized and equipped, it was wholly inadequate under the unprecedented circumstances. It was sufficient for an army of 200,000, but manifestly lacking in every respect for one of 500,000. Thus the British military authorities were faced with the problem of improvising a medical service, not only for 500,000 men on the fighting line, but for an army totalling in round numbers at least 2,000,000. Further, as mentioned previously, the conditions of warfare are entirely different from those formerly met with. In the first place, the long range of modern artillery has rendered it impossible to place field hospitals at a less distance than twelve miles behind the fighting line. Of course, the main object of the medical corps is to afford assistance to the wounded as promptly as possible, for the more quickly wounds are treated, the better is the chance for good results, and in the campaign now going on in France, where the soil is infected with the spores of tetanus, immediate treatment is essential.

Three zones are recognized by the British Army Medical Corps, the collecting zone, the evacuating zone and the distributing zone. In the collecting zone the duty of the corps is to collect the wounded and convey them to the regimental first-aid post, where they are so treated that they may be removed rapidly. The regimental first-aid post is situated, if possible, under cover or out of the line of fire, but should be near enough to the fighting line to be easily accessible. At the collecting zone, the regimental bearers get into touch with the field ambulances which convey the wounded to the clearing hospitals, after which they are distributed to

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the base or general hospitals, these, so far as the British are concerned, being for the most part in Great Britain itself.

The greatest obstacle in the way of the smooth working of the British Army Medical Service has been the lack of rapid and adequate means of transportation. Owing to the destruction of roads, railroads and bridges by the Germans in their retreat from Paris, the transport of the wounded had to depend largely upon motor vehicles, and at first the supply of these did not nearly meet the demand. It goes without saying that rapid removal of the wounded is not only best for their own sake, not to speak of military reasons, but for the morals of the troops generally, and therefore the vital importance of the motor car in modern warfare is easily evident. A fast motor car will convey the British wounded direct to a port whence they can be promptly shipped on a hospital ship, and in a comparatively short time will reach a hospital in their own country in which they will be treated and tended under the most favorable conditions. This war has already taught the lesson that the welfare of the wounded depends almost entirely as to whether they can be transported rapidly to a place where they can receive the best surgical, medical and nursing attention. The motor car appears to be the only fairly sure means of solving the problem, for railroads may be destroyed, while other methods of transport are both too slow and usually too uncomfortable.

C. A. C.

THE HARRISON ANTI-NARCOTIC LAW, ITS RELATION TO THE PHYSICIAN.

Owing to the doubt that exists in the minds of many physicians regarding the interpretation of the Harrison Narcotic Law, I shall endeavor to make clear some of the things the physician must and must not do. According to this law, which became effective March 1, 1915, any physician who dispenses or prescribes opium or coca leaves, or any compound, manufacture, salt, derivative, or preparations thereof must register with the Collector of Internal Revenue of the district in which he resides, and must pay an annual registration fee of $1.00. The preliminary payment of 34 cents covers the period from March 1 to July 1, when the fiscal year of the government begins, at which time the first annual fee of $1.00 must be paid.

A prescription for any of the drugs mentioned in the act must bear the signature, address and registry number of the physician and be dated and signed on the day issued; also the name and address of the patient. It is not necessary for the doctor to keep either copies or records of prescriptions, as this is done by the druggist. Such prescriptions cannot be refilled. If when visiting a patient the doctor administers one of the specified drugs himself, he need not record this. If, however, he orders a nurse to employ such treatment (whether at home or in a hospital), then a record of it must appear in the history sheet, or on a slip of paper with either the physician's name or initials. The provisions of this law do not apply to any prescription that does not contain more than two grains of opium, or more than one-quarter grain of morphia, or more than one-eighth grain of heroin, or more than one grain of codein to the fluid ounce, or, if the preparation is semi-solid or solid, not more than the above amounts of these drugs in one avoirdupois ounce. If a physician orders any of the specified narcotics for his office, he must use the blanks furnished by the Internal Revenue Department in pads of ten for ten cents (to obtain these, a special form must be made out by the physician, bearing his registry number and signature). When a physician dispenses, then he must conform to the same restrictions as a druggist. The drugs must be ordered on the special blanks as mentioned above, and a record (a suitable blank book) must be kept of the narcotics dispensed, the quantity, and the date, name and address of the person to whom they are given being stated. This record must be retained for two years. Specialists using only minute quantities of the stated drugs in their office work are not, however, required to furnish the names and addresses of patients to whom they are administered, but must make note of the date when a given stock solution—say of cocain—is prepared, its amount and strength, and the date when it is exhausted. But if a general practitioner administers morphin, cocain, etc., in his office he must keep a record of the date, name and address of the patient—at least that is what the latest interpretation of the law seems to signify.

EDWARD ADAMS, M.D.

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A CASE OF HEMOPHILIA.*

By HENRY C. DOZIER, M.D., Ocala, Fla.

The patient was Robert S., aged 12 years, white, school-boy.

Previous History: When quite young he began to suffer from excessive and prolonged bleeding upon the slightest provocation. A small cut or a tooth would bleed sometimes for weeks at a time. Four years ago, he began to bleed from the bladder, which continued for about two weeks and gradually ceased. Two years ago, while lying on his bed, in making an effort to get up, his nose began to bleed, and continued in spite of treatment by packing and drugs, local and internal, for three weeks, when syncope occurred. The slightest bruise is followed by a hard bluish-black swelling. The least twist or knock on the joints, particularly the knees, causes them to swell and become painful, giving one the impression of acute rheumatism.

Family History: Father dead, killed by machinery; not a bleeder. Mother living and well, age about 45 years; not a bleeder. Two sisters, living and well; not bleeders. One brother, living, a bleeder, whose previous history is similar to this boy's. Two brothers dead, both about the age of 12 years, death occurring from hemorrhage. One brother cut his wrist while peeling sugar-cane, and slowly bled to death in spite of treatment in a hospital, about three weeks later. This was in 1908. The other brother began to bleed from the bowels and bled to death in a few weeks. I could not find out whether the grandparents were bleeders or not.

Present History: September 22, 1914, the patient began to suffer with pain in his back, on the right side, transmitted towards the bladder and with blood in the urine. Pain ceased after a hypodermic of morphin, and did not return. Blood in the urine continued and increased in amount for the next ten days, during which time I had given him such drugs as gallic acid, calcium chloride, tr. ferri chloride, adrenalin, ergot, etc., with no decrease of the hemorrhage.

On the tenth day I removed the patient to a hospital and began the use of hypodermic injections of coagulose in 10 c.c. doses every three hours. After about twenty-four hours the urine began to look clearer, and after another twenty-four hours we secured one perfectly clear specimen; then blood appeared again for a few times, after which the urine continued clear for about thirty-six hours, when our supply of coagulose was exhausted. We were unable to procure another supply until twenty-four or thirty-six hours later, during which time the hemorrhage recurred, apparently as bad as at first. When our next supply came it was only six doses, and the druggist informed me that he could not secure any more coagulose from either wholesaler in Jacksonville or Tampa, but could get plain horse serum (Mulford), which he did, and this arrived before our six doses of coagulose were exhausted. We thus were able to employ uninterrupted treatment, and the hemorrhage ceased in about seventy-two hours and failed to recur for six days, when treatment was discontinued. I gave 20 c.c. of horse serum a day for three days.

The use of serum, either plain or precipitated, was absolutely all that did any good in this case. Several times before internal treatment had been of no avail, and the hemorrhage had been controlled only after he had reached the stage of a syncope.

This case is interesting because the patient is a typical hemophiliac on the male side of his family; it is also a contribution to the number of cases successfully treated with serum. Drugs were of absolutely no avail, and it required over forty doses of serum, plain, and coagulose.

* Read before Association of Seaboard Air Line Railway Surgeons, Oct. 19-21, 1914.

THE IODINE TECHNIC IN SURGERY.*

By W. H. WILDER, M.D., Birmingham, Ala.

There has been so much written during the past few years on the uses of iodine in surgery that I hesitate to bring the subject before this Association, especially as I have nothing new to offer; but the manner in which I apply this solution is so simple, so economical, so universally applicable and so satisfactory, that I am sure a brief discussion of it will not be out of place at this time. Nor do I claim any originality for this technic, as it was gotten by me from a paper published by Dr. E. H. Beckman of the Mayo Clinic, in 1911; he gives to Dr. Bastianelli, of Rome, proper credit for having originated it. It is no longer confined to Italy, but is now in general use in many of the large clinics in Germany, and is also employed quite extensively in America.

* Read at 19th annual meeting of Association of Surgeons of Southern Railway, June 18-20, 1914.

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This method was first brought out for the preparation of the skin for surgical operations, but has proven so satisfactory to me that I now use it almost universally in giving first attention to abrasions, lacerations, and other freshly made wounds.

Two solutions are necessary: Solution No. 1 is made of one part of iodine crystals to 1,000 parts of benzine. Solution No. 2 is made of equal parts of grain alcohol and U. S. P. tincture of iodine, which has been freshly prepared. These solutions are kept on hand in the office and in the hospital; they are constantly carried in my grip and used both in emergency and elective surgical work.

When a patient is seen with a contused and lacerated wound, no soap nor water whatever is used in cleansing it, but recognizing the fact that the less we disturb the wound the better chance Nature will have to repair the damage done, it is cleansed of all dirt and grease first by applying solution No. 1 with a piece of sterile gauze on forceps; after the parts have been given a few minutes to dry, solution No. 2 is applied in like manner and the wound dressed with plain dry sterile gauze. This dressing is allowed to remain about forty-eight hours, and generally when removed the wound is found to be clean, and usually heals without pus.

Great care should be taken to see that the skin is dry before applying these solutions and, when necessary, to shave hair from the area of the wound. This should be done *dry* or by applying benzine, alcohol or ether, as they will evaporate rapidly. *Do not use soap and water.*

The principal objection urged to the employment of iodine in fresh wounds is the pain it causes; this is of shorter duration and not more severe than that produced by the use of the brush or gauze with soap and water; then, too, iodine is a far better germicide than bichloride of mercury, phenol, and other corrosives, and aids nature in calling out her defensive army of phagocytes.

It is needless to say that the injured parts should be so bandaged as to give them as nearly perfect rest as possible, splints being used when necessary.

I have found the iodine technic especially valuable in the treatment of compound fractures. Solution No. 1 is freely applied first to the outside and then the inside of the wound and dried off; then solution No. 2 is employed in like manner, taking great care to disturb the parts as little as possible and to keep the fingers out of the wound, applying the solution with sterile gauze on sterile forceps and removing only loose pieces of bone with sterile instruments. After this the limb is put in whatever kind of splint that is best suited to the particular case; ordinarily I prefer plaster-of-Paris, reinforced with thin wooden slats worked into the cast so as to strengthen it, and with proper windows cut so as to allow for future dressings.

In these cases the solutions should be used rather freely so as to penetrate every part of the wound. Recently I have treated three compound fractures of both tibia and fibula in this manner and have obtained primary union of the soft parts in all of them. In operations about the eyes and the internal ear these solutions should not be used, because of the severe pain caused by their getting into them. This method of preparing the skin over the nates, perineum and external genitals in obstetric work has been found very satisfactory.

In elective surgery where there is plenty time to prepare the patient, I prefer to have the field of operation shaved with soap and water the evening before, and a bichloride dressing applied. When the patient comes to the operating room next morning solutions No. 1 and No. 2 are applied very carefully as above described, great care being taken not to allow them to run down on the scrotum, in the groin, or other places where they dry very slowly and cause blisters. One application each of these solutions is generally found to be sufficient; however, some surgeons make two applications of solution No. 2, and some substitute pure grain alcohol for this second application of the latter solution. In the last mentioned method we have the advantage of the almost complete removal of the iodine discoloration of the skin, as well as the additional germicidal effect of the alcohol.

From the standpoint of the laboratory man as well as that of the surgeon, this technic has not proven absolutely perfect, and we have many varying opinions from both. Harrington's solution and bichloride of mercury are preferred by Tinker and Prince, who have invariably obtained positive cultures after the use of the iodine technic. However, in *Surgery, Gynecology and Obstetrics,* Vol. 12, page 530, they say: "It is possible that iodine has additional values besides its antiseptic values in that it is an active counter-irritant, and that the increase of flow of blood to the region of operation, with also increase in number of leucocytes present, would favor wound healing."

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On the other hand, Bovee, in the same journal, Vol. 13, page 94, in summing up his observations and experiments says in part: "Tincture of iodine diluted with an equal amount of absolute alcohol may be considered reliable as a local application in preparation of the skin or mucosa in any part of the body. Dilutions of less strength are unreliable if hairs or larger hair follicles are in the field of operation."

In his excellent article on "The Practical Application of Military First Aid in Railway Surgery," published in the *Journal of the American Medical Association* January 21, 1914, Captain Leon C. Garcia, Medical Corps U. S. Army, describes very graphically the wreck which took place on October 19, 1913, when a Mobile & Ohio Railroad train bearing 177 officers and men plunged through a trestle over Rube Burrows Creek near Buckatanna, Miss., carrying three cars and the structure to the ground 35 feet below, and killing 17 and injuring more or less all the others. As to the method of dressing these wounds he says: "All lacerated, punctured or incised wounds and all abrasions of the tissues were painted with tincture of iodine.

"In over ninety cases of open wounds there was only one infected. This infection occurred in a case of compound fracture of the lower third of both tibia and fibula, in which the leg was pinned under the wreckage for six hours in such a position that an occlusive dressing could not be applied. This also was the only injury in which amputation was required.

"A large number of severe lacerated wounds of the scalp were painted with tincture of iodine and stitched up. I subsequently washed dried blood, dirt and cinders from the scalp, and found in all cases a wound healing by primary union."

In summing up the further interesting points in the method of treating the wounds received in this wreck, Garcia says: "It shows the high efficiency of the hospital corps men in emergency work and the remarkable results obtained by the intelligent application of the first-aid dressing and the free use of tincture of iodine in open wounds of any character."

I am fully aware that in the iodine technic as above described we have not reached perfection, that there is a diversity of opinions on antiseptic methods, as well as on most other surgical subjects, and that it is only by careful study, observation and discussion of these matters that we may be enabled to arrive at the best methods of procedure.

No more appropriate words for closing this paper can be found than those of Beckman above referred to, when he says, concerning this technic used at the Mayo Clinic: "We have found this method of preparing the skin suitable for all classes of cases. The only type of case in which we do not use it is in exophthalmic goiter, where it is contraindicated on account of the iodine. It is simple, easy to apply, inexpensive, and so far as antisepsis is concerned, as efficient as any method we have ever tried."

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FRACTURES OF THE WRIST.

By B. M. TITTSWORTH, M.D., Jefferson City, Tenn.

I have treated a great many fractures of all kinds, but have observed more fractures of the wrist than any other.

During my eighteen years of practice I have averaged two or three fractures of the wrist in some form every year, and at the time of writing this paper I had four cases.

By fracture of the wrist I mean the breaking of the bone within an inch of the joint and anterior or posterior to it. The bone most frequently broken is the radius which may be fractured in several different directions

During 1912 fifty-four cases of fractures of the radius were treated at the Surgical Department of the University Hospital at Philadelphia, and forty-two of these were fractures of the lower end of the radius and twenty-seven of the wrist. I have found that most fractures near the wrist are in the radius and most of those near the elbow are in the ulna. I have seen fractures of the radius directly anteroposteriorly or obliquely in all directions, comminuted or impacted, and in some cases compound.

The line of fracture occasionally may run in such a direction as to enter the joint, or frequently the styloid process is broken off, or there may be a separation of the epiphysis of the radius or ulna, or both. I recently had a case of a tear of the posterior annular ligament which simulated a fracture of the wrist.

Next in frequency is a tear fracture of the styloid process of the ulna which is often broken in connection with a fracture of the radius.

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Anterior to the joint we most frequently encounter fractures of the scaphoid and the cuneiform bones which are usually caused by direct violence or by a fall upon the extended hand. I have had only one of this kind which was caused by a cross-tie falling on the wrist. This fracture recalls the emphasis recently placed by Ross and Steward upon tear fractures of the wrist, as superseding the old and vague sprained wrist. In every injury of this region a skiagram should be taken from all sides, since in this way some fractures may be revealed that might otherwise be overlooked.

Fractures of the radius or ulna are most frequently caused by falls on the hand when it is hyperextended. A very common cause since the invention of the automobile is back-firing of the automobile crank, in which the reversing crank carries the hand back into hyperextension. I have had only one case of this kind. All of you who have seen this fracture, in which the lower fragment is displaced upward and backward, know what an ugly picture it presents, but still it is possible for it to occur without resulting deformity.

If the fragment is not displaced much it may be difficult to ascertain the extent of the fracture.

As I have already mentioned, the lower fragment is most often displaced backward owing to the force coming from in front and extending backward, but we may have it displaced in any direction. When there is an epiphyseal separation the displacement is usually forward, but we do not have this after the age of twenty as there is no union of epiphysis with the shaft until that time.

Most of the cases observed by me have presented marked deformity and were easy to diagnose; in fact, I have not had to make a radiograph in many of them for diagnostic purposes. I believe that the majority of these cases can be diagnosed clinically, and no time should be lost in effecting reduction, but a fluoroscopic examination should be made after reduction to see if the fragments are in correct apposition or if there is any other complication. This should be done once or twice during the first week to determine whether the reduction is maintained.

When called to a case of injury to the wrist I always compare the injured with the uninjured wrist and look for deformity, which in fracture is usually present in the silver fork form. Then I look for dorsal displacement of the distal fragment. I next note whether there is any impairment of supination, pronation, adduction and abduction. On palpation there are many things to be determined. I note the position of the styloid process of the radius which naturally extends lower down than that of the ulna, so that in case of fracture we usually find it drawn up even with or a little above the ulna. I examine the injured hand for localized tenderness above and below the joint, this being best detected by pressing on the ridge on the dorsum of the radius. If tenderness be not definitely localized, but extends over the wrist-joint, I would call it a sprain fracture of the wrist. Some patients have so little displacement of the fragments and movements may be so natural that it will be hard to locate a fracture. In a case of this kind I take a radiograph to clear up the diagnosis. Pain is usually present, but crepitus is very frequently absent unless we have to resort to an anesthetic to make a diagnosis; it is then that we are more likely to get crepitus if at all.

This brings to my mind a case I had two years ago in which as a complication of a fracture of the lower end of the radius there was a dislocation of the lower end of the ulna forward, for which we must look out. Also on June 12, 1914, I saw a patient who had a fracture of the styloid process of the radius with a forward dislocation of both radius and ulna.

We will have but little difficulty in distinguishing fracture of the shaft from wrist fractures by the location of the pain and tenderness, and crepitus is easily detected without an anesthetic.

In dislocation of the wrist backward, the posterior prominence of the upper surface of the displaced carpus can be felt lower down on the wrist. The two styloids retain their usual relation to each other, there being no disposition to return after reduction.

In sprains there is tenderness over the articular surfaces of the anterior and posterior side of the wrist. Deep pressure on the radius usually does not cause pain. Any injury to the wrist no matter how trivial should be regarded with suspicion until it is found that fracture is absent.

After we have located the fracture, the next thing to consider is its reduction and the method of treatment that will give the best possible results in the shortest length of time. In reducing a fracture of the lower end of the radius, I grasp the patient's

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hand below the wrist-joint with one hand, and placing my other above the joint, pull hard enough to free the ends of the bone from each other, and flex his hand, pressing it in toward the ulnar side. This is best done under partial or complete anesthesia as may be required. I have reduced and treated most of my cases without an anesthetic. I could tell that reduction was perfect without a radiograph, although I think it advisable to have one made after reduction to determine whether the bones are in correct apposition. There are many cases that are thought to be reduced, but are not and remain so.

When correctly reduced the carpal articular surface of the radius is at right angles to the scaphoid bone. If it still points to the dorsum it is not reduced. You can determine the degree of reduction by the relative position of the styloid processes to each other, as stated above, and by the prominence of the ulna. After reduction I turn the hand loose to see if it will retain its proper position. The next thing to do is to secure accurate fixation, that is, as nearly perfect a wrist as possible, and if reduction is complete it does not require an extra good splint to hold the fragments in apposition. Long experience has led me to adopt two or three kinds of appliances in my treatment of these fractures. I usually apply a straight anterior and posterior splint with small dorsal and anterior pads, being careful in the application of the latter. In order to preserve the best possible usefulness of the wrist and hand and not push the ulna too far forward, the pad or pressure should be direct and even over the radius and ulna in front.

The dorsal pad and splint should be applied with care. See that the splint does not press on the styloid process of the ulna at the lower end. I avoid this by cutting a notch in the dorsal splint or a piece out of the plaster-of-Paris splint where it passes over the styloid of the ulna. I always leave the fingers so they can be moved and massaged, and therefore prevent stiffness of the wrist and hand. I usually take off the dressing every four or five days for inspection of the parts and bathe them in warm soapy water and alcohol, rub them gently and reapply the dressing. This will keep the wrist from becoming stiff as the result of adhesions. I begin passive motion at the end of the second week. I use a plaster-of-Paris splint as often as the straight padded splint, applying it to hand, wrist and arm two-thirds the way up, and after it has hardened slit the sides. I have employed a set of Walker's splints made of wood fiber with marked success in these fractures. The wrist should be placed in a sling in a semi-suspended position resting upon the ulnar side with the hand unsupported. The position in the sling is very important, as lateral deformity may result from its improper use.

Remove the splints during the third or fourth week and employ dorsal and palmar pads, and a few days later dispense with them and support the wrist with a bandage. Fracture of the epiphysis is treated in the same manner as the preceding.

In fracture of the carpal bones, reduce by traction and pressure and immobilize the parts with a palmar splint. In these fractures by all means keep the case under observation.

Surgical Gleanings

Rupture of the Intestines in Children.—Dr. L. Davis (*Bost. Med. and Surg. Jour.*, Feb. 4, 1915) reports two cases, in children seven and eight years old, in which rupture of the small intestines resulted from a fall in one and from being struck by an automobile in the other. Operation was promptly performed and the patients recovered. The author states that in cases of ruptured intestine, with effusion of septic contents, profuse and thorough irrigation of the peritoneal cavity is a life-saving measure. There has been no time for walling off on the part of nature and hence there need be no fear of spreading the infection; it is an entirely different proposition from a peritonitis from an appendix, in which cases nature has practically always had some opportunity of localizing the process, and irrigation is to be condemned. He has found that children and adults retain ordinary tap water by rectum as well, if not better, than normal salt solution.

Diabetes and Surgery.—Dr. E. H. Risley (*Bost. Med. and Surg. Jour.*, Jan. 21, 1915) lays down the following rules in regard to operations on diabetics: (a) A thorough examination of the urine must be made in every case, especially for the detection of acetone and diacetic acid. (b) The total amount of ammonia must always be estimated. No operation except of the extremest emergency should be performed if there is one gram of ammonia excreted in 24 hours, until this has been reduced to the normal amount, .759 gm. (c) An operation should be postponed should there be acetone or diacetic acid, even if the amount of ammonia is normal. (d) Much albumen in the urine is a contra-indication to operation and even in small amounts is of bad prognostic import.

Spinal Anesthesia in Genitourinary Surgery.—Dr. A. H. Crosbie (*Bost. Med. and Surg. Jour.*, Feb. 18, 1915) considers spinal anesthesia the meth-

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od of choice for prostatectomy, either suprapubic or perineal, especially in feeble old men. Tropococian is the drug preferred. When properly induced the anesthesia should last for from three-quarters of an hour to an hour and a half. If the patient is to be operated on in the lithotomy position, care must be taken not to put him in this position for fifteen or twenty minutes on account of the danger of producing too high an anesthesia. Among the advantages of spinal anesthesia are that it reduces shock and the lack of ill effects on the kidneys. Its disadvantages are its toxic elements and the fact that it is sometimes difficult to use in neurotic persons. The toxic dangers have been pretty well eliminated by the perfection of the drug used, and high-strung patients are often helped by injections of morphin given some time before the operation.

Renal Infections.—Dr. W. H. Robey (*Bost. Med. and Surg. Jour.*, Feb. 11, 1915) justly remarks that renal infections are first seen by practitioners, and upon their promptness in making a diagnosis, based on a careful etiological survey, depends the outcome. Cases of pyelitis of tuberculous origin should not be allowed to continue until the bladder is involved. Renal infection must be considered in the differential diagnosis of every febrile affection. The urine may show much or little according to the degree of intrarenal pressure and drainage and the condition of the ureter, so that frequent and thorough examinations of the sediment are necessary. The two most constant signs are pus in the urine and some degree of tenderness in the kidney by bimanual palpation.

Radium Therapy from the Clinical Standpoint.—In a conservative estimate of the value of radium, based upon clinical observations, Dr. W. B. Chase (*N. Y. Med. Jour.*, Jan. 9, 1915) draws the following conclusions: 1. The destructive power of radium on cancer cells is well established. 2. The employment of radium in cancer is not in conflict with surgery, but both possess distinctive fields of usefulness, each having its limitations; they are largely supplemental to each other, and there is ample opportunity for co-operation and reciprocity. 3. Large, operable malignant growths should be removed by the knife. 4. The analgesic power of radium is one of its most precious properties. 5. Want of confidence in radium arises from the use of low grades of spurious products, and from want of knowledge and skill in its application, together with the exaggerated, conflicting, and false reports so constantly current. 6. Postoperative radiation is of great usefulness, and rapidly coming into professional use at home and abroad, being commended by prominent authorities, who not long since were unconvinced of its curative and palliative powers. 7. Crossfire application of radium increases its efficacy and aids by its multiple application in securing deeper penetration of large areas than by ordinary methods of employment. 8. As in surgery so in the application of radium, disappointment is likely to follow too optimistic expectations of recovery. 9. In proportion as metastasis is present, the chances of cure diminish, and in turn delayed diagnosis is often responsible for metastasis.

Therapeutic Progress

THE INTERNAL USE OF RADIUM EMANATION.

In the past ten years a voluminous literature, chiefly of European origin, has sprung up on the use of radium emanation in the treatment of various internal diseases. What probably gave this therapeutic measure its greatest impetus was the discovery of the emanation in the waters of many mineral springs which from a remote past have been esteemed for their medicinal properties. And for the same reason many of the most thorough and extensive investigations of the radium emanation have been made by physicians attached to some of the prominent bath resorts, such as Gastein, Carlsbad, Kreuznach, Aix-les-Bains, Baden-Baden, Nauheim, Marienbad, Homburg, Buxton. Although much of this work has been done in Germany, the first examinations of radio-active natural waters were made by Thompson, Allen and Blythswood in England.

While radium appeals strongly to the imagination as a form of matter which in infinitely small quantity exhibits a tremendous, well-nigh inconceivable energy, it is important to bear in mind that it is the emanation which serves as the carrier of those still mysterious forces which have been utilized in the treatment of disease. The emanation, which is constantly given off by radium, is an inert gas which continuously splits up with the formation of a series of secondary products, known as radium A, B, C, D, E, F, each being derived from the disintegration of the preceding one. Among these, radium C is of especial interest from a medical viewpoint because it discharges not only alpha and beta rays, but the still more important gamma rays. Briefly speaking, the alpha rays are atoms of the element helium charged with positive electricity; the beta rays particles negatively charged and similar to cathode rays; while the gamma rays differ from the others in being waves in the ether, resembling the x-ray. There is likewise considerable difference in the penetrative power of the rays; a very thin sheet of paper, aluminum, lead or silver will prevent the passage of the alpha and soft beta rays, while the gamma and hard beta rays are far more penetrating.

In considering the radium emanation as a remedial agent the question at once comes up whether

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all these rays participate in its physiological action. A distinction, however, must be made here between the external and the internal use of radium. When it is applied externally, as in the treatment of malignant growths, the gamma rays are especially utilized for their selective action upon the cancer cell, although, according to some authors, the harder variety of beta rays has a similar effect. The alpha rays and softer beta rays are excluded by the glass container and by thin metal filters because they are considered irritating. On the other hand, conditions are quite different when radium or the emanation is administered internally, for there can then be no exclusion of alpha and beta rays. The amount of these liberated, however, is very much smaller than that given off when radium in comparatively large quantity is applied externally to a localized area, so that irritation is practically avoided.

Until the physiological action of the different rays has been definitely determined it will be impossible to state in what manner and to what extent each is concerned in the therapeutic effects of the emanation and its active decay products (Ra. A, B, C, etc.). While much remains to be known in regard to its action, it appears to have been shown: (a) that the emanation increases the activity of certain enzymes, such as pepsin, pancreatin, diastase, and the autolytic ferments; (b) that it augments the elimination of uric acid in the urine and dissolves uratic deposits; (c) that it promotes tissue oxidation and the general metabolism; (d) that it reduces the blood-pressure; (e) that it causes more or less increase of the number of red blood cells, and sometimes a temporary leucocytosis. It has also been claimed to exert a bactericidal influence.

Among the diseases in which radium emanation treatment has been employed internally with more or less success, the most satisfactory results have been obtained in gout, especially the chronic form. This is not hard to understand in view of the beneficial effect of the emanation upon uric acid excretion. Under its influence acute exacerbations are prevented, pain relieved, swelling reduced, and gouty tophi frequently absorbed, with more or less restoration of the mobility of the affected joints. In the so-called chronic forms of rheumatism — some of which no doubt are really of gouty character—the results as regards relief of pain, swelling and stiffness of the joints have been excellent and sometimes even striking. Remarkable benefit has been obtained in that intractable disease, arthritis deformans, particularly in the early stages, in which there may be a more or less complete return of mobility and occasionally an arrest of the pathological process. But even in the more chronic cases the patient is often rendered much more comfortable by regaining some function in joints not hopelessly crippled, by alleviation of pain and tenderness, and by improvement of the general health. It is probable that in all these conditions the action of the emanation in promoting the metabolism and its marked analgesic effect play an important part. The same factors also serve to explain the favorable results observed in sciatica and neuralgias. If, as seems to have been demonstrated by some authors, the emanation reduces the blood-pressure, it should be of value in arteriosclerosis, and its favorable influence in activating the enzymes and improving the general nutrition should render it useful in conditions of senility. Whether it is likely to be of benefit in diabetes and chronic Bright's disease, as has been claimed by several clinicians, cannot be decided from the evidence on hand.

Various methods have been adopted for the introduction of radium emanation into the body. The most prominent are: (1) The subcutaneous injection of a soluble radium salt, or of water strongly charged with the emanation. (2) The inhalation of the emanation in specially constructed rooms termed emanatoria. (3) Radioactive baths at the various spas, usually thermal, some strongly and others feebly mineralized. (4) Drinking of radioactive water, natural or artificial. According to many authors, the emanation does not penetrate the skin, or if so, only in small amounts, so that whatever effect is obtained from it in a bath is mainly attributable to its inhalation. Aside from the injection of radium itself, the two principal methods of administering the emanation are therefore by inhalation and by drinking water charged with it. In many of the European spas both methods are combined. Spacious inhalatoria are provided in which the patient remains in perfect comfort several hours, breathing definite amounts of emanation; radioactive baths of various character are given, and the radioactive waters are drunk at the springs. It would not be fair, however, to ascribe the results observed solely to the emanation and to ignore the beneficial influence of other contributory factors, climatic, hygienic, dietetic, etc. Furthermore, the

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mineral ingredients of waters rich in solids (alkalies, purgative salts, sulphur, iron, iodin, etc.) participate in the therapeutic effect; but the important role played by the emanation is strikingly shown by the fact that some radioactive springs containing mere traces of solids have long enjoyed a high reputation in the treatment of various diseases, their curative action being attributed to certain mysterious agencies.

For the many persons who are unable to take a course of treatment at a spa the most practical and inexpensive way of administering radium emanation is by drinking water artificially charged with it; for the natural waters when bottled and transported speedily lose their activity owing to the rapid disintegration of the emanation, the amount being reduced to one-half in four days. While it is claimed that by the inhalation method, which is extensively employed in Europe, the emanation can be introduced in larger quantities into the body, it is more rapidly excreted than when it is taken by way of the stomach, especially after a meal, so that less of the active deposits is left behind. Moreover, properly equipped emanatoria are costly and not available for the many persons who have neither the time nor money to undergo this treatment. For the average case, therefore, the drinking method is the most suitable, particularly as it can be carried out at the home of the patient.

Various apparatuses have been introduced for charging water, plain or mineral, with emanation, usually by means of an insoluble radium salt. The simplest of these known as Radio-Rem consists of porous terra-cotta rods containing definite amounts of an insoluble radium salt in a finely subdivided state uniformly diffused through the mass. When placed in water in tightly closed bottles these rods give off the emanation which dissolves in the water, the quantity produced depending upon the radium content and the time of submersion.

The ordinary outfit consists of eight rods, each furnishing 100 Mache units in four days, so that by drinking the contents of two bottles daily the patient receives 200 Mache units, which represents the emanation present in a liter of the stronger natural radioactive springs. Tablets or plates yielding 500, 1,000, 2,500, 5,000 Mache units per day are also supplied in two bottle outfits, so that from 1,000 to 10,000 Mache units can be given daily. It is interesting to note that in this apparatus the water is charged with emanation in much the same manner in which mineral springs acquire radioactivity, namely, by coming in contact with soil containing minute amounts of radium in an insoluble form. In view of the fact that radium is a very permanent body, losing only one-half its weight in about 1,800 years, these rods retain their activity indefinitely.

The question of dosage of radium emanation is still far from settled. Like with many other new therapeutic agents the tendency has been to administer large amounts of emanation in order to produce a speedy reaction. It must be remembered, however, that little is definitely known concerning the influence of the emanation and of its active deposit upon the different organs and tissues, and for this reason alone it is advisable to begin with moderate doses in order to avoid the possibility of injurious effects. The fact that small quantities stimulate the growth of plants and activate ferments, while large ones exert an inhibitory or even destructive influence, must be given due consideration. Moreover, most of the famous mineral springs have a comparatively low radioactivity, and yet this is sufficient to produce a distinct reaction in gouty and rheumatic cases. Above all, sight must not be lost of the fact that the conditions in which radium emanation has been principally employed are of chronic character, that many of the patients are more or less debilitated, and that intense reactions, such as rapid reductions of blood-pressure, are not free from risk and are therefore undesirable. Probably, it will be ultimately found that, aside from its decided analgesic power, the therapeutic value of radium emanation is mainly dependent upon its favorable effects upon the metabolic processes and upon enzyme activity, and such effects are attainable only by prolonged administration.

Seminal Vesiculotomy. — Dr. Eugene Fuller, the originator of this operation (*Med. Rec.*, Jan. 23, 1915), states that up to date he has performed it in over 700 cases with but one fatality, due to coexistence of chronic nephritis. Less than five per cent. of the patients have been dissatisfied with the operative result obtained. As compared with surgical removal of the seminal vesicles, vesiculotomy does not cause sterility and has often been done to restore potency. There is no injury of the muscular perineal body, the rectal sphincter and its encircling blood vessels in the dissection, and no shock. Though technically more difficult than prostatectomy, the gravity of Fuller's operation is not to be compared with that procedure.

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Original Articles

RENAL CALCULUS.

By H. HORACE GRANT, A.M., M.D., Louisville, Ky.

"Our knowledge of surgical diseases of the kidney is practically theoretical and empirical, being based upon subjective symptoms many of which are erroneous; this is especially true of renal calculus." (From Peterkin, 1909.)

Notwithstanding the tremendous advancing strides toward the acme of perfection attained during the last few decades in the diagnosis of surgical diseases which afflict the *genus homo,* the statement is made without any fear of successful contradiction that, based solely upon the clinical manifestations as described in current text-books, accurate diagnosis of renal calculus is impracticable in many instances. Especially is difficulty encountered by the general practitioner, who as a rule is first consulted for the relief of an attack of acute pain in the loin or lumbar region (the so-called nephritic colic), in arriving at a satisfactory conclusion.

Renal calculi are composed of normal urinary constituents, such as (a) crystals of uric acid, (b) urates and phosphates, (c) calcium oxalate. While no age is entirely exempt, calculus deposits are more commonly observed during adult than in adolescent and infantile life. Renal calculi occur with greater frequency in males than females in the proportion of more than fifteen to one, the reason for which has never been clearly explained. The formation of a urinary calculus becomes possible only in the presence of a foreign body which acts as a nucleus. This may be either a minute blood clot, a particle of mucus or pus, micro-organisms or parasites. Contrary to the statement of certain authors that fifty per cent. of all calculi are ureteral, it is believed their formation invariably occurs within the kidney pelvis or its calices, and therefore their presence within the ureteral lumen is purely secondary.

Large calculi may exist for a long period within the renal pelvis without the production of sufficient disturbance to attract attention of the patient. The concretions may vary greatly in size and conformation, from the minutest round or oval sand-like particles, which may traverse the ureteral lumen and escape into the urinary bladder without the knowledge of the patient, to large and irregularly shaped masses which tax the maximum capacity of the kidney pelvis including some of its calices. Cases have been recorded where immense calculous masses completely filled the renal pelvis, with projections into some of its calices and also into the ureter. Such large calculi, however, must be exceedingly rare.

Renal concretions may be single or multiple, the right kidney is more often implicated than the left, and the lesion is bilateral in about twenty-five per cent. of cases. It must be remembered, therefore, that the extrusion of one or more calculi during an attack of so-called nephritic colic does not necessarily signify that others may not be present within the calices, the renal pelvis, or the ureter.

Symptomatology. Among the most prominent classical symptoms of renal calculus as recognized and described by the majority of text-book authors are: (1) Acute pain beginning in the kidney region and radiating downward toward the thigh, the lumbar region, the genital organs, etc., and (2) the presence of macroscopic or microscopic blood in the urine. There are numerous other more or less indicative and confirmatory signs, such as sand-like particles in the urine, kidney enlargement, intermittent anuria, vesical irritation. These symptoms are said to be more significant "if the patient is of a gouty or rheumatic diathesis," [1] whose urine contains an excess of uric acid and the urates.

[1] The term "diathesis" should be eliminated from the vocabulary of those making any serious pretense to scientific attainment, since as commonly employed it is practically meaningless. The diathetic and hereditary theories have hitherto been greatly overestimated and overworked in attempted explanation of the existence of maladies the etiology of which appeared submerged in obscurity.

The patient may give a history of renal colic, or of long-continued dull aching pain in the lumbar region. A calculus unaccompanied by infection and which does not obstruct the urinary outflow may cause little or no discomfort, but where it produces ureteral obstruction intense pain may result. The patient may present collapse, free perspiration, and unconsciousness may supervene. Severe pain is usually accompanied by a chill, vomiting, and frequent micturition. It is said that the nearer the bladder the calculus is located, the more frequent will be urination, but there has been suggested no reasonable explanation for this fact excepting the greater liability of vesical irritation. During the height of the attack the temperature may be moderately elevated, and when infection ensues other characteristic symptoms occur.

Pain. There are multitude of lesions which may be productive of acute pain in the kidney region simulating that produced by renal calculus, among which may be mentioned: Appendicitis, fecal stasis, movable kidney, renal tuberculosis, hydro- and pyonephrosis from other causes, neoplasms involving the kidney or adjacent structures, including the cecum, the ascending colon, the peritoneum, the small intestine, also tubo-ovarian lesions, cholecystic and hepato-cystic disease, gastric, pyloric and duodenal lesions, rheumatism, so-called lumbago. In a small percentage of cases (ten to twelve per cent.) of renal calculus pain is not a concomitant factor. Therefore, it would appear that the classical symptom of lumbar or loin pain when present is never conclusive of renal calculus, and when considered alone may have no especial diagnostic significance.

Hematuria. In the diagnosis of renal calculus particular emphasis has hitherto been placed upon the importance of hematuria. It must be remembered that blood may be noted in the urine of individuals apparently in normal physical health. As the urine is practically never examined macroscopically or microscopically until an attack of renal pain occurs, this symptom when present is of doubtful diagnostic value unless other indicative signs are also present. Experience has shown that in a certain percentage of instances of undoubted renal calculus hematuria is never a concomitant symptom. Moreover, hematuria may be due to a variety of causes bearing no definite relationship to calculus, viz., ureteral infection and ulceration, vesical, prostatic and urethral lesions, the presence of parasites in the urogenital tract, laceration of the kidney from trauma, renal tuberculosis, systemic diseases causing vascular changes in the urogenital tract, the administration of inordinate doses of certain drugs, congestion due to pressure of the gravid uterus (in females), neoplastic formations, etc. Thus hematuria, the most reliable symptom according to the majority of authors, cannot be regarded as a pathognomonic sign of renal calculus, and until the origin of the hemorrhage has been positively ascertained its presence at best is inconclusive evidence.

The other symptoms enumerated as being indicative of renal calculus are so inconstant that specific consideration seems unnecessary. However, the observations are important that (a) complete anuria may ensue from reno-reflex influence in the presence of unilateral obstruction, that (b) hydro- or pyonephrosis occurs only when ureteral obstruction is partial or temporary, that (c) in permanent and complete obstruction atrophy and cessation of renal function is the rule.

Diagnosis. As already stated, the diagnosis of renal calculus may be impracticable if based solely upon the clinical symptoms, and even although pain, hematuria, and some of the other presumably indicative signs are usually present, resort must be had to mechanical measures for confirmatory evidence. These include radiography, cystoscopy with ureteral catheterization, and pyelography. The application of these scientific mechanical aids to diagnosis is largely responsible for the current belief that renal and ureteral calculi have markedly increased during recent years. There has probably been no material increase in the frequency of such lesions, but improved methods of examination having rendered possible accurate diagnosis in practically every instance, more cases are now recognized than formerly, the increase being thus more apparent than real.

While accurate diagnosis of renal calculus is usually possible by careful employment of the mechanical aids mentioned, the results obtained by radiography alone may sometimes be misleading unless the shadowgraph catheter is also used. It must be borne in mind that not only may confusion arise in interpretation of the radiographic plates, but lesions

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other than renal or ureteral calculi may produce shadows. For these reasons several exposures at different angles should be made, and careful consideration accorded each, before definitely deciding upon the diagnosis.[2] The following are some of the lesions which may cause confusion: Phleboliths in the renal vein, calcification of serous pockets in muscular tissues of the lumbar region, myositis ossificans involving the psoas and quadratus lumborum, exostoses of the ilium, calcification of the cartilaginous extremities of the lower and false ribs, also of the transverse apophyses of the lower dorsal and first lumbar vertebræ. Intestinal concretions and foreign bodies may be mistaken for renal or ureteral calculi. Even a shadow superimposed upon the kidney outlines is not positively indicative of renal calculus, as the colon may contain concretions. Enteroliths and other pathological lesions in organs adjacent to the kidney have caused diagnostic errors. A carcinoma with calcified areas involving the pancreatic head (Ponzio) has been mistaken for a renal calculus. Cholecystic and hepato-cystic calculi, also appendiceal foreign bodies and concretions, have been mistaken for renal and ureteral stones.

Cystoscopy and ureteral catheterization should invariably be employed in connection with radiography unless there exists some valid contraindication. If calculi exist within the ureteral lumen, detection is almost certain by introduction of the wax-tip catheter; but obviously when located within the kidney, failure will attend this procedure, as the calculi are beyond reach of the instrument. When hematuria is present, if the blood originates in the kidney, cystoscopy and ureteral catheterization will demonstrate the implicated organ. In rare instances introduction of the ureteral catheter may be impossible.

In symptom-producing renal lesions which persist despite appropriate palliative or medicinal treatment and in which the diagnosis cannot be otherwise determined, pyelography may be practiced according to methods originated by Voelcker and Lichtenberg (1906) and recently elaborated and improved by Braasch and others. In experienced hands the technic of pyelography is not especially difficult. Care must always be exercised to prevent overdistension of the kidney pelvis. In the presence of a markedly diseased kidney, e. g., in hydronephrosis, pyonephrosis, etc., the procedure may be attended with considerable danger. Several fatalities have been reported seemingly attributable to this procedure, but most likely they were at least partially due to some fault in execution of the requisite technic.

Notwithstanding the fact that the clinical signs are not entirely trustworthy from the standpoint of accurate diagnosis, all the symptoms enumerated in the foregoing must be given careful consideration to assist the surgeon in differentiating between renal calculus and other lesions. A painstaking anamnesis is important, as it may develop the history of previous attacks of pain with hematuria, these being regarded as the most constant indicative clinical signs, although as already shown they are not pathognomonic of renal calculus. In all suspected cases confirmatory evidence must be procured by employment of the mechanical measures mentioned, and the importance of these extraneous diagnostic aids cannot be too strongly emphasized. In rare instances differential diagnosis may be impracticable, and in such cases, if the symptoms are progressive, exploratory laparotomy may be justifiable in the interest of the patient.

Treatment. The treatment of renal calculus must be considered from the standpoint of both medicine and surgery. In the majority of instances the general practitioner (rather than the surgeon) is first called to see the patient during a paroxysm of so-called nephritic colic. The immediate medicinal treatment will depend largely upon the severity of the attack. Sometimes the pain is so excruciating that the inhalation of ether or chloroform will be required to afford relief, but the hypodermic administration of morphin and atropin will usually suffice. The attack may persist hours or days, depending upon the size and shape of the calculus and the facility with which it traverses the ureteral lumen. Pain usually subsides when the calculus reaches the urinary bladder. While relief may sometimes follow a hot bath and hot local applications, frequent doses of morphin may be required during the entire attack to insure a reasonable degree of comfort to the patient. Free diuresis and urinary antisepsis should be promptly secured by the exhibition of such remedies as boric acid, salol, urotropin, sodium benzoate, turpentine, etc., supplemented by large quantities of water.

[2] Although it seems superfluous to do so, the caution is again repeated that to be of any value all laboratory work should be executed by an expert in that particular line, and radiography is no exception to the rule.

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If it should so happen that the calculi are in the process of formation and are still friable, their further disintegration and expulsion with the urine may be facilitated by diluent and so-called solvent drugs, but definitely formed calculi cannot be dissolved within the organism by remedies internally administered. Medicinal treatment is particularly indicated where infection exists in any portion of the urogenital tract, bacterial action being lessened by employment of the agents already mentioned. However, medicinal treatment must be considered primarily palliative rather than strictly curative, as in most instances the cause of the symptoms cannot be thereby eliminated.

The most appropriate procedures in connection with the surgical treatment will depend upon several pathologic factors, viz., (1) the location and size of the calculi, (2) the degree of obstruction produced, (3) the structural damage inflicted upon the kidney or ureter, (4) the presence or absence of complications, such as infection, etc.

Where calculi exist within the kidney pelvis or its calices, or impacted within the reno-ureteral orifice, their removal may be successfully accomplished by pyelotomy or pyelolithotomy. If located deeper within the kidney structure, nephrotomy will be required for their liberation. Small obstructing calculi situated near the uretero-renal orifice may be dislodged by the ureteral catheter and forced backward into the renal pelvis, from which they may be subsequently extracted by pyelotomy.

Where calculi are impacted in the mid-portion of the ureter, causing partial or complete obstruction to the urinary outflow, the proximal ureter may become so markedly distended and distorted that a considerable portion of the distal undilated ureter becomes invaginated therein, and because of the distortion thus produced the catheter cannot be introduced for the purpose of dislodging the calculi and overcoming the obstruction. In long-standing cases of this character infection and ulceration may ensue with perforation of the ureteral wall, lumbar or pelvic abscess being the logical ultimate result. Such complications should be prevented by prompt ureterotomy with removal of the calculi and suture of the ureteral wall. If the invocation of surgery be delayed until perforation and considerable structural damage have ensued, resection may be required for restoration of the ureteral lumen. Fortunately, however, instances of this character are exceedingly uncommon, operation being usually undertaken before the obstruction has become chronic.

The degree of obstruction produced by calculi may have an important bearing upon the question of operative treatment. It must not be forgotten that hydro- and pyonephrosis sometimes follow incomplete or partial obstruction to the urinary outflow, whereas in complete and permanent obstruction there occurs renal atrophy with cessation of function.[3] If obstruction is sudden and unattended by appreciable clinical manifestations, the pathology may remain unrecognized provided the opposite kidney retain its normal functionating capacity. And, strange as the observation may appear, calculi occupying the entire renal pelvis and its calices and producing no symptoms during life have been discovered at necropsy, the patients perishing as the result of some other pathology.

The extrusion of small imperfectly impacted calculi located within the mid-portion of the ureter, causing partial obstruction to the urinary outflow, may occasionally be facilitated by the injection of olive oil or glycerine through the ureteral catheter, provided sacculation and distortion of the proximal ureter have not ensued. This procedure failing, resort may still be had to ureterotomy.

Calculi impacted within the lower third of the ureter, or near the uretero-vesical orifice, may oftentimes be dislodged and extrusion favored by the injection of oil or glycerine through the ureteral catheter. Moore and several other prominent surgeons have reported successful results following this simple procedure. In some instances a small catheter may be introduced beyond the obstructing calculi, thus permitting escape of the accumulated urine and affording temporary relief. If the obstructing calculi are not expelled within a reasonable time, more radical procedures may be then employed in accomplishing their extraction.

Impacted calculi located within or slightly above the vesico-ureteral orifice may in some instances be successfully removed through the operating cysto-

[3] This view has been proven correct by observation and experience, although it is directly opposed to the belief of many of the older as well as some of the more modern authors who hold that hydronephrosis only occurs following complete obstruction to the urinary outflow.

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scope, with or without enlarging the ureteral orifice. This method has been satisfactorily employed by Braasch, Young, Lewis, Moore, Casper and many other surgeons. As it is claimed no mortality attends the cystoscopic operation, the method is certainly worthy of consideration in suitable cases. In the event failure attends this procedure, other methods may be employed.

In chronic obstruction from calculi, where extensive renal infection has already ensued and the preservation of a functionating kidney is unlikely by conservative methods of treatment, primary nephrectomy is the most appropriate procedure. It is unwise to temporize by performing nephrotomy with drainage in the hope of a favorable outcome, as continued suppuration may endanger the integrity of the opposite kidney and also constitute a distinct menace to the life of the patient.

One of the most serious effects of calculi situated in the upper urogenital tract is anuria. Complete anuria sometimes occurs from unilateral incomplete ureteral calculous obstruction, the functionating capacity of the opposite kidney having previously been shown to be normal, and in such instances the most plausible explanation is that there occurs a so-called reno-reflex action which causes cessation of function in the healthy kidney. When anuria supervenes such measures must be promptly instituted as will secure immediate relief to the patient. While cases are recorded in the literature where no urine was voided for several days and yet the patients recovered,[4] if the diagnosis of calculous obstruction has been confirmed it is the surgeon's duty in the interest of the patient to urge immediate surgical intervention.

In the presence of complete anuria from unilateral obstruction, relief may be expected to accrue from operation upon the obstructed kidney or ureter. It must be remembered, however, that bilateral calculi occur in about thirty per cent. of cases. When bilateral obstruction has been demonstrated, thus making it certain that the anuria is not due to the so-called reno-reflex action, of course immediate bilateral operation is imperative to afford relief.

Before undertaking any surgical operation which may jeopardize the integrity of one kidney, the functionating capacity of the other must be determined as accurately as possible. This may be accomplished preferably by employment of the phenol-sulphon-pthalein test, but the use of indigo-carmine and phloridzin may also prove satisfactory for the purpose.

Ultimate Results. The mortality from purely medicinal treatment of renal calculus is an absolutely unknown quantity; it may range from nothing to one-hundred per cent., depending entirely upon circumstances. There may be a single small calculus which, without causing noticeable obstruction of the ureteral lumen, escapes into the urinary bladder during a mild attack of so-called nephritic colic, and the patient is permanently relieved. On the other hand, however, the calculi may be large or multiple, causing partial or complete obstruction, followed by either anuria, infection, hydro- or pyonephrosis, pyelitis, uremia and death, the mortality being thus one hundred per cent.

The death-rate from operative intervention in uncomplicated cases in the hands of a competent surgeon should be relatively inconsiderable. Provided relief accrues from application of the simpler procedures noted herein—cystoscopy with ureteral injection of olive oil or glycerine, dislodgment of calculi by the catheter, removal of calculi through the operating cystoscope—there should be no mortality. Where these methods are inapplicable, and pyelotomy, pyelolithotomy, or nephrotomy is required, in uncomplicated cases the death rate should also be practically *nil*. Where infection has ensued and nephrectomy is performed, if the opposite kidney is normal in functionating capacity and if the operation be not too long delayed, it should be followed by slight mortality.

In complicated, long-standing cases, where the renal function has become seriously impaired from obstruction, suppuration, etc., where the vitality of the patient has been thereby markedly reduced, and especially where bilateral calculous obstruction exists, it is hazardous to intravene surgically, and under such circumstances a mortality of at least fifty per cent. may be expected.

Only by early diagnosis and prompt surgical treatment may the most favorable ultimate results be expected.

[4] The older literature contains the records of numerous cases where patients voided no urine for long periods, but it is believed such observations were either based upon erroneous premises, or there was intentional misrepresentation of the facts, since no prototypes can be found in more recent times. Even the modern records of complete anuria for periods ranging from ten to thirty days with recovery seem open to serious question.

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REMOVAL OF THE LACHRYMAL SAC AND ACCESSORY LACHRYMAL GLAND.

By JOHN M. WHEELER, M.D., New York.

For several years extirpation of the lachrymal sac has been quite generally advocated for cases of chronic dacryocystitis which cannot be cured by probing and irrigating the lachrymal passages, but the operation has been performed successfully by comparatively few oculists or general surgeons because of the difficulty of the dissection. It cannot be claimed that the removal of the tear sac in its entirety is easy, but if the surgeon will study the anatomy of the parts carefully on the cadaver, and repeatedly practice a definite operative technic on fresh anatomical material, he need not fear the operation on the living. If one is thoroughly familiar with the anatomy of the parts and with the proper technic of removal of the sac, there need be no dread of failure to find the structure or no necessity to remove it "piece-meal." When properly performed, the operation yields most gratifying results, as the source of the pus formation is removed and the patient is relieved of the possibility of an acute dacryocystitis. Even if none of the lachrymal gland is excised, excessive overflow of the tears is reduced by extirpation of the sac. This is brought about by the cure of the conjunctivitis which is caused by inflammation of the sac, and which causes hypersecretion of the gland. It should be borne in mind that in taking out the lachrymal sac the surgeon does not rob the patient of tear drainage, as there is no passage of lachrymal secretion through the drainage apparatus into the nose in cases which are suitable for the extirpation operation.

Several operations have been suggested for establishing drainage into the nose through a passage made in one way or another through the nasal wall of the lachrymal sac, the lachrymal and superior maxillary bones and the nasal mucous membrane. The false passages made by these operative procedures usually close, and the final results are disappointing. Complete removal of the sac is far more satisfactory.

OPERATION FOR EXTIRPATION OF THE SAC.

Instruments. A hypodermic syringe, small scalpel, mouse-tooth forceps, splinter forceps, small curved scissors, Müller's speculum, small curette, needle-holder and silk sutures.

Injection. If the operation has to be done under general anesthesia a solution of adrenalin 1:4000 may be used to control the hemorrhage. The operation may be performed under local anesthesia almost without pain. A reliable solution for injection is made up of cocain 4 per cent. one part, adrenalin 1:1000 one part, and distilled water two parts. Novocain in 2 per cent. solution has also been found satisfactory.

Superficial injection is made under the skin along the anterior crest of the lachrymal groove. The deep injection into the tissues is made by entering the hypodermic needle 4 m.m. above the inner canthus and carrying the point of the needle straight



Fig. 1. Extirpation of the lachrymal sac, showing puncture points for deep injection. The internal canthal ligament is put on the stretch with the thumb of the left hand.

back to the tissues above the dome of the sac. The distance which the point of the needle should penetrate must be governed by the character of the tissues about the sac. In an emaciated subject with no inflammatory thickening, the dome of the sac is very near the skin. In a well nourished individual, with thickening of the tissues due to dacryocystitis, the distance from the skin to the dome of the sac may be two or three times as great as in an emaciated patient. On an average, the needle point should penetrate about ¼ inch (6 m.m.). Another deep puncture may be made 4 m.m. below the inner canthus. The needle is now made to enter the neck of the lachrymal sac by puncturing the skin at the junction of the lower orbital margin and the anterior crest of the lachrymal bone and carrying the needle

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in a direction downward, backward and inward. As the solution from the syringe is pressed into the sac it usually displaces whatever secretion may be within the sac cavity, and this secretion together with cocain and adrenalin solution is forced through the canaliculus. The solution within the lachrymal sac anesthetizes and blanches the canaliculi, mouth of the nasal duct, sac wall and all of the tissues surrounding it, and further deep injection is unnecessary. The operation may be started immediately on completion of the cocain and adrenalin injection.

Primary Incision. This should start 3 m.m. above the canthal ligament (tendo oculi) and pass 3 m.m. to the nasal side of the inner canthus and be carried down along the anterior crest of the lachrymal groove to the mouth of the duct (Fig. 2).

Dissection. The skin is dissected with the tooth forceps and scissors away from the canthal ligament, where it is quite adherent, and from the orbicularis muscle above and below the ligament, enough so that the speculum of Müller may be introduced. It is well to adjust the upper teeth of the speculum first and to spring the wound well open before setting the speculum.



Fig. 2. Incision through skin and internal canthal ligament.

Next the canthal ligament is thoroughly exposed by passing the closed points of the scissors firmly along the upper and lower margins of the ligament in a direction parallel to its fibers. The ligament is cut about 2 m.m. from its nasal end at right angles to its surface. Then the orbicularis fibers are divided along the anterior crest from the upper to the lower end of the primary incision. This exposes to view the deep fascia which directly surrounds the lachrymal sac. Pointing the scissors backward and inward, cut through the deep fascia immediately behind the stump of the canthal ligament. This exposes the anterior wall of the lachrymal sac. This is of a different color and of less firm consistency than the tough fascia which surrounds it. Divide the fascia along the whole length of the anterior crest of the lachrymal groove. When properly made, the incisions in the orbicularis muscle and the deep fascia should be as long as the primary incision in the skin and directly behind this incision. Extirpation is often rendered unnecessarily difficult by incomplete exposure of the sac. If these incisions have been properly made there will be a tendency for the deep fascia to separate from the sac wall. Pick up the deep fascia with the mouse-tooth forceps and dissect it away from the sac wall by gently moving the closed points of the scissors up

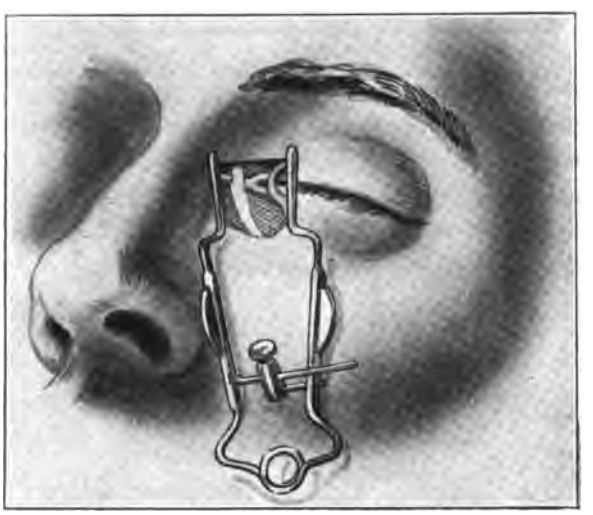


Fig. 3. Speculum has been introduced, and incision in deep fascia has been made. The white area represents sac wall.

and down in contact with the deep fascia, but taking care not to pierce the fascia and so go out of bounds. Resistance to this dissection will be met with where the canaliculi join the lachrymal sac, or, in other words, at the ampulla, and this may be snipped through with the scissors. The dissection should be carried back to the posterior crest of the lachrymal groove.

Up to this point, the sac has remained attached to the periosteum lining the groove, and is especially adherent along the anterior and posterior crests and at the dome and neck of the sac. If there is a slight shelf of deep fascia overhanging the sac along the anterior crest, this may be divided behind the stump of the ligament. In order to facilitate starting

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the detachment of the sac from the periosteum, grasp the sac by taking a good amount of the wall with the forceps, and make gentle traction away from the periosteum. Then by careful manipulation the delicate fascia between the sac wall and

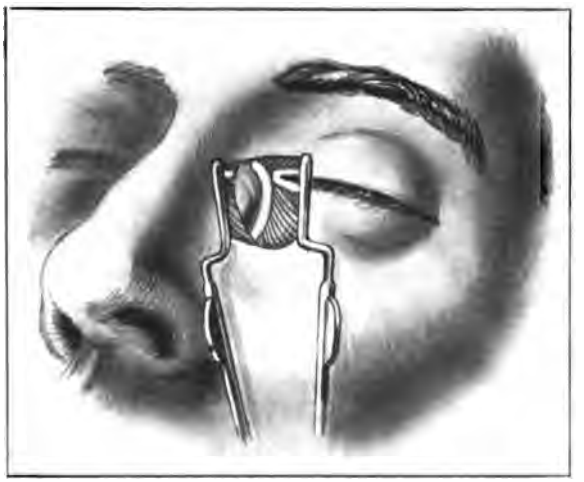


Fig. 4. Deep fascia has been dissected from the sac, exposing its temporal wall.

periosteum is dissected by running the scissors lengthwise of the lachrymal groove and snipping along the anterior crest, and wherever else may be necessary. Carry this dissection from the dome of the sac to the mouth of the duct. Next grasp the

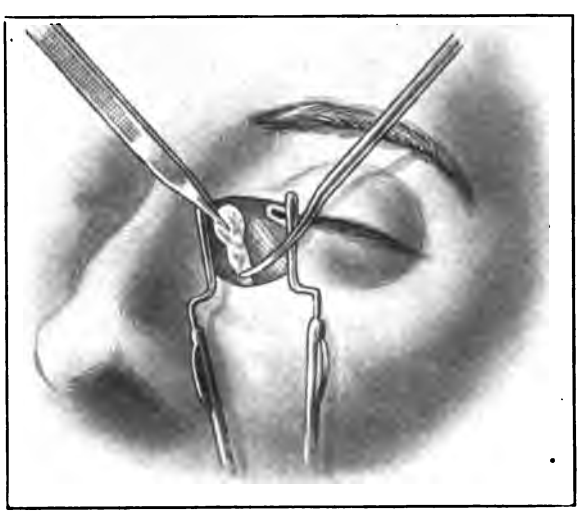


Fig. 5. Lachrymal sac has been dissected out completely and is ready to be cut off at mouth of nasal duct.

upper portion of the sac wall and cut it free from the adherent tissues at the dome. Lift the sac wall gently out of the cavity and divide the adhesions along the posterior crest with the scissors. Then pull it gently upward so as to put the neck on the stretch, and free the lower end completely from the adherent tissues that surround it. Keep the traction of the sac in an upward direction, straddle the mouth of the duct with the blades of the scissors, and cut it off as low as possible. If the surgeon has been successful in removing the lachrymal sac in its en-



Fig. 6. Sutures introduced so as to raise slightly the temporal skin flap.

tirety, it will not be necessary to use the curette, but if it is feared that mucous membrane may be left behind, it should be removed by careful but thorough curetting.

The cavity should be irrigated with boric acid

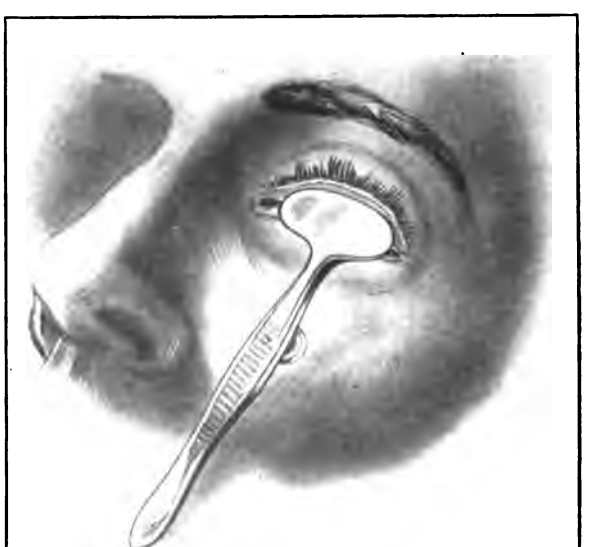


Fig. 7. Excision of accessory lobe of lachrymal gland. Upper eyelid has been everted and Ehrhardt lid forceps applied ready to throw lid into double eversion.

solution, and if the operator chooses he may swab it out with tincture of iodin.

Suturing. In sewing up the wound it is good practice, but not necessary, to sew up the canthal

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ligament. Introduce the skin sutures in such a manner that the temporal flap will be slightly raised, as the tendency following this operation will be toward ectropion and proptosis of the lower lid, especially if there has been a fistula and inflammatory tissue has been removed (Fig. 6).

After-Treatment. Bichloride vaseline is smeared on the wound; iodoform gauze dressing and pressure bandage are applied. The first dressing is left on for two days after operation. The sutures are removed four or five days following operation.

If annoying overflow of tears persists after the removal of the lachrymal sac, the palpebral portion of the lachrymal gland may be resected.

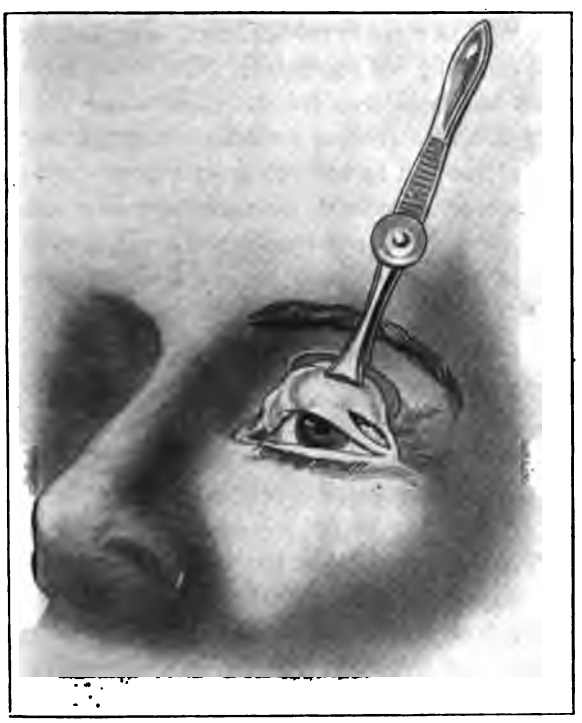


Fig. 8. Upper lid held in double eversion. Incision in conjunctiva has been made, and edge of lachrymal gland presents in wound.

Excision of the Palpebral Portion of the Lachrymal Gland.

Anesthesia. This operation may be done under local anesthesia by cocain and adrenalin injection, but it is better to put the patient under general anesthesia, as there is considerable hemorrhage and pain under local injection. If performed under general anesthesia, an injection of 1:4000 adrenalin should be made in and about the gland through the conjunctiva.

It may be considered good surgery to resect the palpebral portion of the lachrymal gland in all cases of extirpation of the sac which are done under general anesthesia.

Operation. The lid should be held in double eversion. This is best accomplished by the use of the Ehrhardt lid forceps. It may be held less conveniently by the use of a bone spatula and fixation forceps. Make an incision through the conjunctiva extending from the outer canthus to a point above the outer margin of the cornea. As a rule, the position of the gland can be easily detected by a rounding elevation which presents itself on everting the lid. On completing the conjunctival incision the thin capsule surrounding the palpebral portion of the gland comes into view, and the conjunctiva is readily separated from this membrane. Grasp the gland with the fixation forceps and dissect out carefully with the scissors. In excising this portion of the gland the ducts which are embedded within it are resected, and the result of this operation in reducing epiphora is due more to the resection of these ducts than to the removal of the gland tissue proper. The conjunctival wound is closed with two or three fine gut sutures. Excessive dryness of the eye does not occur following this operation, and the results are eminently satisfactory.

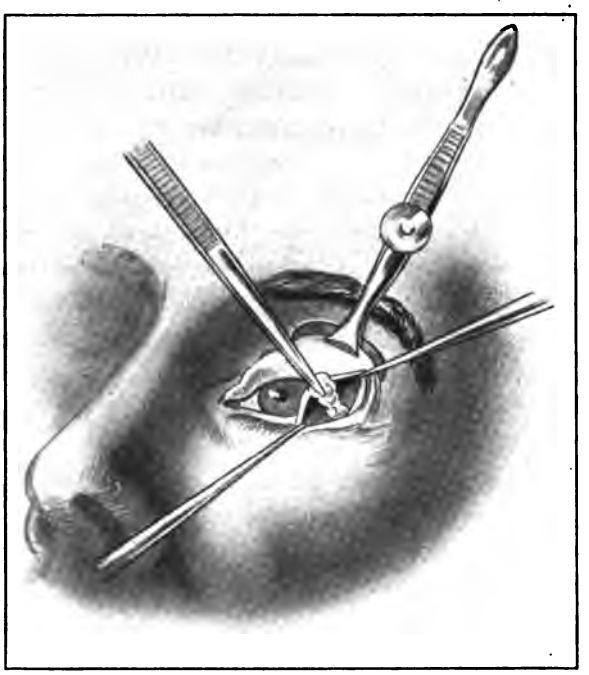


Fig. 9. Conjunctiva retracted. Accessory lobe of lachrymal gland dissected out, and held in forceps ready to cut off.

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THE IMPORTANCE OF EARLY TRACHEOTOMY.

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One word in the above title is of supreme value. It is the word *early*. Every text-book dealing with diseases of the larynx, whether from a general or special viewpoint, has some reference to tracheotomy as a life-saving measure. Indications for operation, pathology of conditions calling for its performance, technic, instrumentarium required, etc., are all mentioned *in extenso,* but seldom is any emphasis placed upon its timeliness.

Edema of the glottis and diffuse infiltration of the larynx are sudden conditions. The warning that they are imminent is usually given by the symptoms of the case, but how often is this warning heeded? Hundreds of cases are reported in the medical literature about as follows: "Although an immediate tracheotomy was performed the patient died suddenly." Is the author always quite sure that the tracheotomy was immediate? Was there no waiting period to see just what was going to happen, and if it did happen was he not then "going to get busy with the tube?"

Within a relatively short period four cases have come to my notice where the intentions were excellent. Three of the four died before the tube could be introduced.

A young married woman consulted her physician about an ulcerated wisdom tooth. The physician referred her to his dentist who passed her on to an extracting specialist. The day following the extraction there was a good deal of swelling and difficulty in swallowing. On the second day she became so uncomfortable that she again consulted the extractor, who attempted to scarify the swollen throat but accomplished nothing. A physician was then called who examined the throat, recognized the swelling, and told the patient that if it was not better in the morning he would *probably* be obliged to cut open the windpipe and introduce a tube. This was at 6 p. m. At 5 a. m., after a restless night, the woman's husband was awakened by gasping and choking noise. He ran out and obtained three doctors who came prepared to do a tracheotomy. Before the trachea could be entered the patient died. There was little sepsis, merely a diffuse infiltration of the deep tissues of the larynx blocking off the air supply.

A second case was that of a farmer in a remote country district who inhaled a wheat beard while threshing. Indirect examination disclosed the foreign body lodged in the glottis, but the physician could not dislodge it. He knew nothing of Killian's or Jackson's tubes. The man choked to death four days later.

Two of the patients in mind were physicians. One died of asphyxia implicating the glottis in an acute infectious disease. At least four of his friends, one a laryngologist, one a surgeon and the other two eminent and capable medical men, watched the patient carefully for some days. The filling up in the throat had been seen for some hours and had been struggled with from a symptomatic standpoint. It seemed too bad to have to greet a confrére with a tracheotomy tube in his air ways. Finally, with the physician-patient *in extremis,* tracheotomy was performed. Death occurred on the table. It was too late!

The fourth case was that of an interne in a well-known general hospital who had "sore throat and fever" for several days. His attending surgeon was advising him about gargles and taking occasional cursory glances into the oral cavity. Suddenly the throat began to fill up, the young doctor began to gasp and grew black in the face. A laryngologist who happened to be in the building was called. Within five minutes he had introduced a tracheotomy tube, through which the interne-patient coughed out a large piece of diphtheritic membrane! The case was one of laryngeal and tracheal diphtheria. It only remains to say that the gentleman has carried on a successful practice in Canada since his recovery.

None of the cases here cited were patients of mine, but they are authentic.

It may be well to enumerate briefly the conditions which sometimes call for tracheotomy: A foreign body not removable by upper bronchoscopy, edema of the laryngo-pharynx from whatever cause, laryngeal diphtheria, intrinsic growths of the larynx (cancer) and extrinsic growths (goiter), paralysis of the laryngeal separator group of muscles, syphilis, phlegmon (retro-pharyngeal abscess), tuberculosis, perichondritis, scleroma (rhino-laryngo-scleroma), and leprosy.

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Writing in 1879 Sir Felix Semon said*: "I am the most decided advocate of its early performance. I feel sure that the unfavorable results obtained in two of our cases and mentioned in several of the instances reported by other observers are solely due to the fact that the operations were performed too late, when the carbonization of the blood had already gone too far. Everybody knows how much better the final results of tracheotomy in diphtheria and other diseases in which this carbonization is to be feared are, when the operation is timely performed, than when it is left to the last minute."

Professor Semon's words are words of wisdom and may well be applied to all cases and not merely to those with muscular paralysis.

Dr. G. B. Trible, of the U. S. Navy, in outlining the treatment of children with laryngeal difficulties in the Karolinien Kinderspital, Vienna, describes certain contraindications for intubation which in reality become indications for tracheotomy. When the nutrition and bodily vitality are low and ulcers from the wearing of a laryngeal tube are likely, Trible thinks we should do tracheotomy in preference—for example, in tuberculosis, rachitis, measles, scarlet fever and general cachexia.

Trible would introduce a tube: (1) Above the larynx in stenosis of the pharynx caused by septic diphtheria, in edema of the epiglottis and in retropharyngeal abscess. (2) In the larynx in the course of ulcerations spasm of the glottis and "laryngitis purulenta." (3) Below the larynx in pneumonia, and in diphtheria of the trachea and bronchi.

To some this classification may seem extreme. Personally, I do not think we should encroach on the legitimate field of intubation with O'Dwyer's tubes, which in most cases are entirely satisfactory. In adult cases, however, tracheotomy is certainly the first choice.

Chevalier Jackson writing in *The Laryngoscope* (April, 1909), says:

"Wider employment of tracheotomy in the more favorable classes of cases than is now usual, besides reducing its mortality almost to *nil*, will give us a better conception of its usefulness. The wonderful general therapeutic effect of better oxygenation and the local improvement from putting the larynx at rest can be seen even in such serious conditions as typhoid perichondritis and laryngeal tuberculosis. Yet it is, I think, unknown to the general practitioner, and under-appreciated by the laryngologist."

In conclusion *I wish to recommend tracheotomy as a life-saving measure only when it is performed early,* before evidence of stenosis becomes manifest in the dusky face, cold sweat and feeble, rapid pulse. Every physician and surgeon should have ready an emergency tracheotomy set which will fall under his eye at a moment's notice. Such a set may consist of nothing more than a knife, a pair of forceps and a tracheal tube. More elaborate additional items to the outfit will readily suggest themselves.

14 Central Park West.

36 S. Highland Ave., Ossining, N. Y.

* Rep. Trans. of Clin. Soc., Vol. 12, "Question of Tracheotomy in Bilateral Paralysis of the Posterior Crico-arytenoid Muscles."

DISEASES OF THE NOSE, THROAT AND EAR FROM THE PRACTITIONER'S VIEWPOINT.

By James Joseph King, A.B., M.D., New York.

Attending Laryngologist, Hospital for Ruptured and Crippled; Chief-of-Clinic, Ear, Nose and Throat, Gouverneur Hospital; Clinical Assistant in Otology, New York Eye and Ear Infirmary.

The Physiology of the Upper Respiratory Tract and the Nose, Throat and Ear in Relation to General Medicine.

The Physiology of the Nose.

The functions of the nose are:

1. Olfactory.
2. Gustatory.
3. Ventilation of the accessory sinuses and middle ear.
4. Phonatory.
5. Respiratory.

The olfactory or first cranial nerve is the nerve of the sense of smell. It arises in the frontal lobe, the optic thalamus, and island of Reil, and is distributed over the Schneiderian membrane. Its filaments are distributed over the upper third of the nasal septum, the attic, and over the superior turbinate and margin of the middle turbinate bones.

Anosmia, or loss of smell, is dependent upon two factors. There may be intracranial disease, producing degenerative changes in the nerve itself; or there may be obstruction within the nose, preventing the access of the odoriferous particles to the peripheral endings of the nerves. Either condition will produce loss of smell. If due to nasal obstruction, it may be regained, if not of too long standing, under appropriate treatment. If due to

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a destruction of the nerve or the tract in the brain in which the nerve arises, the prognosis is grave.

The loss of smell in man may be a menace to life as well as a great inconvenience. The absence of the pleasurable sensation of fragrant aromatics and such things is complained of by those who have lost this sense. I have recently had a patient, a lady, who almost lost her life through asphyxiation from illuminating gas because of her inability to detect its odor. The gas was escaping and she did not know it until her husband came into the room and found her in a half asphyxiated condition, with the room filled with gas. In the lower animals the sense of smell is more acute than in man, and it is a means of their detecting and finding food.

The real gustatory or taste sense is supplied by the glossopharyngeal and fifth nerves. The delicate flavors, however, which add so much to the enjoyment of the consumption of food, are appreciated through the sense of smell.

A very important function of the nose is the ventilation of the nasal accessory sinuses and of the middle ear through the Eustachian tube. The mucous membrane lining the nasal accessory sinuses is not so well supplied with bloodvessels as the nose



Fig. 12. Bacteria in ten liters of laboratory air before passing through the nose. (Wright and Smith's Diseases of the Nose and Throat.)

itself; therefore the recuperative power of these sinuses is not so great as that of the nose. An obstructed nose interferes with the drainage from these sinuses and produces diseases. The cardinal principles in treating most infections or diseases of these sinuses are ventilation and drainage. If these two are accomplished, nature will go a long way in effecting their recovery. If, however, the nose, by its obstruction of the free entrance of air to the sinuses, has lost this part of its function, the inflammation in the sinuses may persist and become chronic—a condition which is both annoying to the patient and troublesome for the physician to relieve.

The function of the nose in ventilating the middle ear through the Eustachian tubes is of paramount importance. This function is sometimes called the auditory function of the nose. A large number of cases of middle ear deafness are due to impaired nasal respiration, as is seen with children having adenoid vegetations in the naso-pharynx. Many such children have impaired hearing.

The phonatory or vocal function of the nose is the part it plays in the production of the voice. While sound is produced in the larynx by the vibrations of the vocal cords, it receives many added characteristics by its passage through the nose and naso-pharynx. In individuals whose nose or naso-pharynx is obstructed, the sound of the voice is changed, and such a person is said to be talking through his nose. He is not talking through his



Fig. 13. Bacteria in ten liters of laboratory air after passing through the nose. (Wright and Smith's Diseases of the Nose and Throat.)

nose, but the voice is changed by reason of not passing through the nose.

The most important function of the nose is respiration. The air in passing through the nose is filtered, warmed, and moistened before it reaches the larynx and lungs. The stiff hairs or vibrissæ at the vestibule arrest particles of dust and filter the air. The generous arterial supply passing longitudinally through the inferior turbinates warms the atmospheric air to body temperature. Atmospheric air, no matter what the temperature, is changed to almost body temperature by simply passing through a normal nose. Experiments have shown that by the time it reaches even the naso-pharynx it is brought up to body temperature, 98.4° F. The mucus secreted by the glands of the mucous mem-

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brane of the nose serves the purpose of moistening the air. These glands are situated chiefly in the inferior turbinate body. Thus it is seen how important a function the inferior turbinate has. Therefore it should not be removed entirely except for malignant disease or tuberculosis. Its removal is followed by a dry nose. Mouth breathing produces a dry condition of the pharynx and larynx. The dust laden air also produces an irritation in the pharynx and larynx and is a frequent source of inflammation of these organs.

The Pharynx.

The naso-pharynx acts as a resonating chamber of the voice. The Eustachian tubes open here, so that when the warmed, moistened, and filtered air reaches them from the nose they are properly aerated. The other functions of the laryngo- and oro-pharynx are digestion, phonation, and respiratory. They form a common tract for the food in its passage to the esophagus and the air in its journey to the lungs through the larynx and trachea. The soft palate drops backward against the upper posterior pharyngeal wall in the act of swallowing, thus separating the oro-pharynx from the naso-pharynx. Patients suffering from paralysis of the muscles of the soft palate, or its absence, have difficulty in swallowing liquids, as part of them will pass through the nose. This paralysis is seen most frequently following diphtheria.

Larynx.

The larynx serves the purpose of sound production, respiration, and deglutition. The inspired and expired air passes through the larynx. During inspiration the glottis becomes more patulous, and in expiration it becomes again narrowed. By means of a laryngeal mirror, the vocal cords are seen to widen during a deep respiration. Sound is produced by the vibration of the vocal cords of the larynx. It varies in quality with the length, thickness, and tension of the cords, and with the size and shape of the larynx and the force with which the expired air is thrown against them. Sound alone is produced by the larynx, and speech is the modification of this sound made by the teeth, tongue, lips, etc.

During deglutition, the larynx is brought up under the base of the tongue, out of the way of the bolus of food. The epiglottis serves to partially protect the opening to the larynx. The epiglottis has often been entirely removed without impairing the act of swallowing. It was formerly considered very necessary in shielding the entrance to the larynx during deglutition, but is no longer so regarded.

The Ear, Nose and Throat in Relation to General Medicine.

It is now recognized that many general conditions manifest themselves locally by affections of the ear, nose, or throat, and vice versa, many affections originating within the ear, nose or throat give rise to diseases in some organ far removed from them, as appendicitis or cholecystitis following an attack of tonsillitis, in which the same infectious microorganism has been isolated from both the tonsils and the appendix or gallbladder. Ballenger has well stated: "With this broader view, they are now regarded as the pursuit of the practice of general medicine and surgery, with special reference to the diagnosis and treatment of diseases in general, and those of the nose, throat, and ear in particular."

When the physiology of the nose is considered, it is readily conceivable how the general health may be affected by a disturbance of the nose in the performance of its important functions. Every ear, nose and throat practitioner has seen patients with a chronic infection of the nose, or throat, or accessory sinuses disturbing their general health and welfare. Rosenau has reported many cases of streptococcic infection of the tonsils followed by appendicitis, cholecystitis, arthritis (commonly called rheumatism), endocarditis, myocarditis, nephritis, etc. His splendid research work along this line is too well known to require further comment. Hunner of Baltimore has reported several cases of cystitis following tonsillar infection which cleared up after the removal of the tonsils. Recently Oppenheimer has reported a number of cases of infective arthritis following or complicating an otitis media. Such occurrences are so common to those of us who see many patients with infections of the upper respiratory tract that we cannot but be impressed by their significance.

Recently I presented before the Rhinological and Laryngological Section of the New York Academy of Medicine fifteen cases of tonsillar infections due to a Gram negative diplococcus—the Connellan-King diplococcus. In this report four of the cases are illustrative of the relation of infections of the upper respiratory tract to the general system. In this series these infections produced various symp-

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toms. One patient with a tonsillar infection became affected with arthritis in knee and ankle, nephritis and endocarditis. He was confined to his bed a total of twelve weeks. Since clearing up the infection in his tonsils and complete enucleation of them, his physicians now pronounce him a well man.

In another case in this series, the nephritis and slight elevation of temperature persisted until the infection in his tonsils was eliminated. In a third, the patient presented symptoms of a violent asthma, which persisted until the tonsillar infection was cleared up.

The fourth case to be mentioned here presented symptoms simulating a sarcoma of the tonsil, with typical lymphadenitis. Under appropriate treatment these symptoms are clearing up and the patient's general appearance is markedly improved.

The full reports of the cases above mentioned will shortly appear elsewhere as a preliminary report of tonsillar infections due to the Connellan-King diplococcus, and I merely mention some of them here to illustrate the point in question.

In a personal communication, Dr. George H. Bell has corroborated my opinion on ear, nose and throat infections in relation to diseases of the eye. In diseases of the conjunctiva, especially chronic conjunctivitis, where the condition tends to hang on, the nose should be thoroughly examined and treated as per indications found there. In all cases of unilateral papillitis and retrobulbar neuritis, the nose and accessory sinuses should be examined and explored, if necessary. Phlegmons of the orbit are frequently caused by purulent frontal, ethmoidal and sphenoidal sinusitis. In cases of orbital cellulitis, it is well to bear this in mind unless there is a history of traumatism. In uveitis the nose should always be examined, as a great many such cases have been relieved by the removal of a middle turbinate bone, or such other operation or treatment as was indicated within the nose. In chronic uveitis too great stress cannot be laid upon the examination of the nose and accessory sinuses.

Several years ago, at Knapp's Hospital, I took part in the examination of the eyes of a large number of patients with affections of the nose and accessory sinuses. The nose and sinuses were carefully examined, and the eyes were also examined by members of the staff. In a surprisingly high percentage of such cases the vision was reduced, the blind spot increased, the field limited, etc. It is a not uncommon occurrence for the vision to be markedly improved after intranasal operation upon the ethmoid, septum or sphenoid. I recall now one patient with ethmoiditis and sphenoiditis, with vision of 20/200 before operation, which after operation became 20/70. Inflammation of the sphenoid not infrequently produces blindness, and cases are recorded in which vision has been restored after operation upon the sphenoid. Three of my patients have told me that not until I had operated upon their noses had they been able to get a satisfactory refraction by their oculists. One of them had a deflected septum, posterior tips of the inferior turbinates and adenoids. Another had ethmoiditis and a chronic inflammation of the antrum. The third had a deflected septum and maxillary sinusitis. The last mentioned was accustomed to making regular visits to her oculist for refraction. Neither the oculist nor she was satisfied with the result of the refraction. After I did a submucous resection of the nasal septum, relieving the pressure at the point where the middle turbinate and septum encroached high up on the left side, and relieved the maxillary sinus of its inflammation, she returned to the same oculist for her periodical examination and refraction. To his great gratification, he obtained a more satisfactory refraction than ever before. She then told him her nose had received appropriate treatment since her last visit to him.

Physicians who frequently see such results are convinced of the close relationship of one organ of the body to another. All the organs are more or less intimately connected by the vascular, the lymphatic and nervous systems. Disturbances in one organ, therefore, affect the others. The bloodvessels and lymph-channels carry toxic material to all the regions of the body and in this way influence the functional and pathological processes in them.

40 East Forty-first St.

(To be continued.)

New Incision for Varicocele Operation.—Drs. E. G. Ballenger and O. F. Elder (*Med. Rec.*, Feb. 27, 1915) suggest that in operating for varicocele when the scrotum is to be amputated, the incision for the varicocele may be made through the part of the scrotum to be removed, making it unnecessary to have more than one skin incision. By this method there is less danger of hemorrhage and infection.

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LOCAL ANESTHESIA IN THE REPAIR OF HERNIA.

By Charles Goodman, M.D., F.A.C.S., New York.

Clinical Professor of Surgery, New York University and Bellevue Hospital Medical College; Attending Surgeon Beth Israel Hospital and Montefiore Hospital and Home for Chronic Invalids.

The purpose of this paper is to add the testimony of the writer's experience of the advantages of local anesthesia with novocain-adrenalin solution in the repair of hernia.

The fear and dread of cocain poisoning and the disastrous consequences following its use prevented its universal application. The comparatively slight toxicity of the synthetic preparation novocain and its remarkable analgesic properties when combined with adrenalin or suprarenin have practically dispelled every possible objection towards the adoption of local anesthesia in major surgery.

Pulmonary and renal complications causing prolonged convalescence which follow the administration of ether occur from time to time in all surgical clinics. It must, however, be conceded that the placing of the administration of ether in the hands of trained assistants who are well versed in its application has reduced the evil results from general anesthesia to a minimum.

It is not intended to dwell upon the inherent and potential dangers incident to general anesthesia; a personal experience with the use of novocain-suprarenin in over a hundred herniotomies has proved the method to be a matter of choice rather than necessity in this and many other operations.

Skepticism still exists in the mind of the profession when a statement is made, that the repair of hernia with entire absence of pain can be accomplished with the use of local anesthesia. This lack of confidence in its efficiency can only be subscribed to by those who have witnessed the improper technic in a most suitable region. Like all new laboratory procedures or diagnostic methods which must stand the test before being generally accepted by the profession, the same may be said to be true of local anesthesia in the repair of hernias of the inguinal region.

When the technic is mastered the limitations are so few that it must lead to a universal adoption of the procedure.

The principal methods are those of neuro-regional or nerve blocking introduced into surgery by Cushing, Crile and Matas after Corning's discovery that cocainization of a nerve trunk abolishes pain sensation throughout its distribution, and the method of infiltration advanced by Reclus and Schleich and perfected by Braun. Novocain, which is about seven times less toxic than cocain, is the anesthetic of choice. The analgesic properties of the drug are decidedly increased and rendered more lasting by the addition of adrenalin, or preferably the synthetic L-suprarenin, while its toxic properties are reduced to a minimum.

The purpose of this paper is to emphasize particularly the practical and successful use of the drug by this method in operations for hernia of the inguinal region. The technic employed is the one evolved by Braun of Zwickau. The object is to infiltrate the nerve trunks which supply the operative area, and also to circumject the field of operation for the purpose of blocking the afferent impulses from the terminal branches; the direct injection of the nerve trunks is not necessary. The blocking of the impulses can be satisfactorily accomplished by infiltration of the surrounding tissues. According to Braun, novocain brought in contact with the nerve filaments is absorbed by them sufficiently to block the impulses.

A definite knowledge of the anatomy and careful handling of the tissues are necessary; these precautions will reduce the likelihood of infection and avoid trophic and motor disturbances, due to the unintentional cutting of the nerves.

So far, in the repair of hernia, no contra-indication to the use of local anesthesia by novocain-suprarenin has been presented. The most timid and neurotic invalid can be induced to submit, with the assurance of absence of pain and discomfort. It has been of great interest to have the patients in Beth Israel Hospital express their requests and preference for operation without general anesthesia, because of the encouragement passed from bed to bed by those who have already been operated upon under local anesthesia.

The disadvantages set forth against the method have been claimed to be: The necessity of too careful and deliberate work which entails the expenditure of too much time; but on the other hand, we claim that it takes some time to get the patient well under general anesthesia. In the presence of pulmonary, cardiac and renal complications, as well as the debilitated conditions due to strangulated and incarcerated hernias, the advantages of the technic

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surpass anything that the surgeon can offer, as compared to a general anesthetic, even when administered by an expert.

The safe and advantageous application of local anesthesia is not limited to the field of herniotomies alone, but has proved most satisfactory in many conditions, including chronic appendicitis, thyroidectomy, empyema, exploratory laparotomy, exploration of the bladder and others beyond the realm of minor surgery, which are not for discussion within the scope of this paper. The experience and the results obtained have been sufficiently gratifying for the writer to recommend its universal adoption in the repair of hernias of the inguinal region.

The technic used is that described by Braun. We have observed that an infiltration of the neck of the sac, either before or after its incision, will minimize the discomfort which may otherwise ensue during its ligation. Unless contra-indicated, the patient should receive a preliminary hypodermic of morphin or morphin and atropin one hour before the operation.

Two points of entrance are marked on the operative field: Point one—three fingers' breadth internal to the anterior superior spine of the ilium. Point two — just over the horizontal ramus of the pubes at the external inguinal ring. From point one the needle is introduced perpendicularly, and the aponeurosis of the external oblique muscle and muscular layer of the internal oblique and transversalis are infiltrated. The needle is then partially withdrawn and inserted twice again, each time in a more oblique direction, towards the spine of the ilium, until it strikes the iliac bone. This injection blocks the ilio-inguinal and the ilio-hypogastric nerves. About 20 cc. of a half per cent. solution of novocain-suprarenin is injected. From 10 to 20 cc. of solution is then injected in a fork-shaped manner toward a point lying in the median line, laterally, from the inguinal ring. From point two a deep injection of 10 cc. of the solution is made in a fan-shaped manner on either side of the cord. The skin incision is finally circumjected subcutaneously in the form of a rhombus.

From 75 to 100 cc. of the solution are necessary for the entire injection. In a double hernia, both sides are injected before the operation is begun. We have not so far observed any untoward effects or evidences of poisoning from this amount.

The time required for infiltration with novocain-suprarenin is fifteen minutes.

In some of the larger clinics abroad the infiltration of the operative field is performed by a trained assistant, thereby saving considerable time for the surgeon.

In our experience we have observed occasional nausea but not any vomiting. We have noted the absence of abdominal distress and distention incident to the postoperative course of a general anesthesia. Catheterization was rarely resorted to. The appendix was removed during the repair of the hernia in several instances, without causing any degree of discomfort during the operation. The wounds healed promptly and without any complications.

As soon as the safety and simplicity combined with a thoroughness of operative detail afforded by this method become more generally known, the writer has reason to believe that the repair of hernias of the inguinal region with local anesthesia by the infiltration method will be more generally adopted.

A CASE OF MULTIPLE LARYNGEAL PAPILLOMATA IN A CHILD. TREATMENT BY DIRECT LARYNGOPLASTY AND FULGURATION.

By JOHN B. McCOY, M.D., New York.

Thomas F., aged five years, was seen in the early part of October, 1912, and the following history obtained: About two years ago his voice became husky, and this has greatly increased; about six months ago his respiration began to be embarrassed; otherwise he has always been a perfectly healthy child. Examination showed the presence of adenoids and enlarged tonsils, and with the laryngeal mirror a large mass of papillomata was seen extruding from the larynx. At this time the child was suffering quite markedly with dyspnea and operation was advised. Accordingly, on October 10, 1912, he was placed under chloroform anesthesia, and through the direct laryngoscopic tube the growths were removed. They seemed to involve the whole larynx, above and below the cords. After the operation the child's respiration became practically normal.

On December 2, 1912, the tonsils and adenoids were removed. On December 19, 1912, the growths

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seemed to have entirely reappeared and dyspnea again became evident. It was decided to put the larynx at physical rest and a tracheotomy was done with intention of leaving the tracheal tube in for a year or more. The papillomata were again removed at this same sitting, and the patient made a good recovery from both operations.

On March 17, 1913, they had entirely reappeared. It was then decided to try surgical removal and fulguration, and so about every month from March 17, 1913, to June 4, 1914, the growths were excised and this was followed by fulguration of the base.

In the early part of June, 1914, there seemed to be a complete disinclination of the growths to recur, and accordingly on June 4, 1914, the tracheal tube which had been worn for about fifteen months was withdrawn and the tracheal wound sutured together. The patient was watched closely for about three weeks, and as there was no evidence of recurrence he was allowed to go to the country. When seen on October 1, 1914, the condition of the larynx showed no return of the papillomata, but a considerable hypertrophy of the laryngeal tissues has remained. It is believed that this tissue will finally undergo involution.

The patient, however, will be observed from time to time to watch the progress of his condition, and should it tend to grow worse, he may have to wear hard, rubber dilating tubes for a while.

157 West 73rd St.

SOUTHERN SURGICAL AND GYNECOLOGICAL ASSOCIATION.

Twenty-seventh Annual Session, Dec. 16, 1914.
Authors' Abstracts of Papers.

GALLSTONES DURING THE COURSE OF 1,066 ABDOMINAL SECTIONS FOR PELVIC DISEASE.

By REUBEN PETERSON, M.D., Ann Arbor, Mich.

It is generally agreed that the appendix should be inspected and removed, if necessary, when the abdomen is opened for pelvic disease. This does not hold true if the pelvic disease be of such a nature that further abdominal manipulation will very likely contaminate clean peritoneum, or is contraindicated by the condition of the patient.

The same kind of reasoning applies to the gallbladder when the abdomen is opened for pelvic disease. The patient has the right to demand that all her abdominal derangements be cared for at one and the same operation in so far as this can be done with comparative safety. Since in quite a percentage of cases of pelvic disease gallstones are present and give rise to symptoms prior to or subsequent to the pelvic operation, unless contraindications exist similar to those cited in the case of the appendix, the gallbladder should be palpated and calculi removed when the abdomen is opened for other purposes.

The day of the small abdominal incision is past. The incision should be large enough to allow of thorough exploration. Otherwise important lesions in other portions of the abdomen will be undiscovered and the patient left in an unsatisfactory condition because, while cured of one lesion, she will suffer from another.

Operations on the gallbladder or biliary passages are contraindicated in the presence of malignant disease of the uterus or of the appendages, unless imperatively demanded for the relief of pain.

A careful history will sometimes fail to reveal symptoms pointing to gallstones. Yet when calculi are found at the pelvic operation, vague symptoms ascribed to "gastralgia" or "indigestion" are explained. To leave gallstones under such conditions will result in only a half cure of the patient, no matter how skillfully the pelvic lesions have been cared for. Furthermore, in order to secure the best operative results gallstones should be removed as early as possible, before complications have set in.

This paper is based upon observations made upon coincident gallstones in 1,066 pelvic operations performed by the abdominal route. In every instance the pelvic symptoms predominated, the strictly gallbladder cases being eliminated. In every instance, then, the question had to be decided at the time of the pelvic operation, when the gallstones were found, whether it was advisable to proceed and effect their removal. This naturally raised the question as to whether uncomplicated gallstones really called for intervention, a question that can only be answered by obtaining the after histories of patients where the calculi were left at the time of the pelvic operations. This has been done in quite a large proportion of the cases and the results analyzed.

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Among the 1,066 patients gallstones were found 135 times, or in 12.66 per cent. of the cases. Kelly estimates that they were present in 8 per cent. of his gynecologic patients. In 1,244 patients operated upon at the Mayo Clinic for uterine myoma 7.1 per cent. had gallstones.

Gallstones are more common in women than in men. The high percentage in the present series (12.66 per cent.) is probably due to one or more of three causes: the relatively advanced age of the patients examined, since it is fairly well established that the older the person the greater the liability to gallstones; the high percentage of women in the series who have borne children, or finally to the large proportion of uterine and ovarian neoplasms present in the women examined for biliary calculi.

The percentage of gallstones increased with each decade from the age of twenty, varying from 6.8 per cent. in 276 patients examined between the ages of twenty and thirty to 29.1 per cent. in 24 women between the ages of sixty-one and seventy.

Pregnancy and the puerperium favor the formation of gallstones. Among the causes may be mentioned the encroachment of the enlarging, pregnant uterus upon the liver and its biliary passage, thereby favoring the stagnation of the bile stream, the resulting infection of that stream and the formation of calculi. Constipation in women produced by the lack of exercise and the pregnant state also tends toward infection of the bile ducts and gallbladder. Women who have borne children are more subject to gallstones, as shown by the fact that 114, or 84.41 per cent., of the 135 patients with biliary calculi in the present series had borne children. Mayo found 90 per cent. of his patients with gallstones had borne children and that 90 per cent. of these identified the beginning of their symptoms with some pregnancy.

Gallstones were present in 10.8 per cent. of 285 cases of fibromyomata; in 14.5 per cent. of 103 sizable ovarian cysts, and in 19.6 per cent. of carcinoma of the cervix and body of the uterus. In 55 patients with gallstones having these neoplasms, 40 or 80 per cent. were over forty years of age. The high percentage of biliary calculi in cases of cancer of the uterus (19.6 per cent.) is probably explained by the age of the patients, since all the 11 were over forty years of age. Looking at the question from another standpoint, in 382 patients with either fibroid, ovarian cysts or cancer of the uterus, but without gallstones, only 52.36 per cent. were over forty. In other words, age, not disease, is the determining factor in the formation of calculi.

The gallbladders were drained in all but two of the 57 cases where the gallstones were removed. The gallbladders were attached to the parietal peritoneum, probably accounting for certain cases of soreness and dragging pain in the gallbladder region considered in detail among the end results. There were two operative deaths in the 57 patients. These cannot be ascribed to the surgery of the gallbladder but to peritonitis from unsuspected virulent, purulent foci in the pelvis. The convalescence of the patients from their pelvic operations was rarely prolonged by the additional gallbladder operations.

The attempt to arrive at end results from correspondence with patients is not altogether satisfactory. The more the form letter asks the less information is secured. Therefore, inquiries were confined to presence or absence of symptoms referable to the gallbladder.

The 135 patients with gallstones were divided into two classes: (a) those from whom the gallstones were removed (57); (b) those where they were palpated but for one reason or another were not removed (78). Forty-five, or 81.8 per cent., of the first class and fifty-five, or 77.4 per cent., of the second class were traced and their replies analyzed as follows:

(a) Cases where gallstones were removed incidental to pelvic disease.

Among these patients were two primary deaths, and 45 out of the remaining 55 were traced. Of these 45 patients, 29, or 64.4 per cent., wrote that they had no symptoms referable to the gallbladder since their operations; that is, they had had no gallstone colic, no jaundice, no pain in the gallbladder region, no symptoms of indigestion which could be ascribed to biliary calculi.

On the other hand, 16 patients, or 35.5 per cent., of the cases, reported symptoms having to do with the gallbladder region. However, most of those with symptoms, 11 out of the 16 patients, had had no gallstone colic nor other symptoms which would lead one to suspect that they had had a recurrence of the calculi. Their symptoms were dragging pains in the right side in the neighborhood of the incision, or soreness in the same region. As before stated, these symptoms are attributable to the method of

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operation employed, the dragging upward of the gallbladder and fastening it to the parietal peritoneum. The occurrence of such symptoms in a certain proportion of cases where the gallbladder is drained by this method has been noted by other observers, and has led to its drainage in the natural position and non-attachment to the parietal peritoneum. In further series of cases this latter method will be employed with the expectation that the symptoms described above will be largely done away with.

Five patients had distinct gallstone attacks following removal of the calculi and drainage of the gallbladder. One patient had the gallbladder removed nine years after the cholecystotomy, no stones being found. Another was operated upon ten years after and had fifteen stones removed. Still another patient, according to the testimony of her physician, suffered from repeated attacks of biliary colic just after returning home from the hospital, but had had no recurrence for a number of years at the time of the report.

Summarizing these findings, it is fair to state that 40 out of the 45 patients, or 88.8 per cent., were free from gallstone colic following the operations, while 11.1 per cent. had a recurrence of the colic. Whether all the stones were not removed at the time of operation or whether calculi re-formed after their removal it is difficult to say. Occasionally gallstones do re-form, but from the testimony of those with the most experience it is exceedingly rare.

It is to be regretted that time has not permitted a careful perusal of the histories in reference to the presence of symptoms prior to the pelvic operations, but such a research is so time-consuming that it has been left for a subsequent paper. It can only be stated that while in a few cases gallstones were suspected prior to the pelvic operations, in no instance were the symptoms such as to overshadow the importance of the pelvic condition. However, it is only fair to say that more careful gallbladder histories may increase greatly the number of suspected cases.

(b) Cases where gallstones were found but not removed at the time of the pelvic operations.

As expected, the primary mortality was high in this class of cases, for it included many patients with complicated tumors and some operated upon radically for cancer of the uterus. There were seven primary deaths from causes it is unnecessary to detail since they have no especial bearing upon the main objects of this paper. They are only of importance as showing the severity of the procedures and why it was deemed inadvisable to remove the gallstones at the same operation.

Of the 71 remaining patients, 55, or 77.4 per cent., were traced. Four patients died subsequently, three from causes unconnected with the biliary tract, and one six years after the pelvic operation from what was apparently hepatic cancer preceded by attacks of biliary colic.

Of the 51 surviving patients from whom replies were received, 32, or 62.7 per cent., had no symptoms referable to the gallbladder, although one or more gallstones were present in each instance when they were discharged from the hospital. On the other hand, 19 patients, or 37.2 per cent., wrote that they had had symptoms referable to the gallbladder; 10 had had distinct gallstone attacks; 6 had suffered from pain in the region of the gallbladder; 2 had been operated upon for gallstones, while one had been jaundiced.

Had it been possible to perform cholecystotomy at the time of these pelvic operations, over 90 instead of 62 per cent. of these 51 patients would have been spared symptoms referable to the gallbladder. But in many of the cases additional operative procedures were clearly contraindicated, and if they had been carried out would have greatly increased the primary mortality. Still in some of the cases the gallstones could have been removed had we been possessed then of the evidence now at hand, that the calculi left at the time of pelvic operations will give rise to distinct subsequent gallbladder symptoms in 30 per cent. of the cases. In another series of cases I would remove gallstones in every instance unless such a procedure be distinctly contraindicated.

Conclusions.

1. Except when contraindicated by the condition of the patient or the possibility of contaminating clean peritoneum, the gallbladder should always be palpated when the abdomen is opened for pelvic disease.

2. Hence the small abdominal incision should give way to one large enough to permit of thorough exploration of the abdominal cavity.

3. Gallstones will be found incidental to pelvic disease in from 10 to 15 per cent. of the cases.

4. Their frequency will depend upon the ages of

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the patients more than upon the variety of the pelvic disease.

5. As with gallstones in general, in women with or without pelvic disease, the older the patient the more liable is she to have gallstones.

6. Gallstones are much more common in women who have had children; in the present series of cases 84.4 per cent. of the 135 women with biliary calculi incidental to pelvic disease had borne children.

7. When gallstones are removed at the time of pelvic operations from 85 to 90 per cent. of the patients will have no subsequent symptoms referable to the gallbladder, provided the proper technic be employed.

8. When gallstones are not removed either because their mere presence is not thought to warrant their removal or because the condition of the patient forbids further operative procedure, 30 per cent. of the patients will suffer subsequently from gallstone attacks or other symptoms referable to the gallbladder.

9. Therefore, since gallstones are always liable to produce symptoms and at times are a distinct menace to the patient they should be removed when the abdomen is opened for pelvic disease, if this can be done without much additional risk to the patient.

DIAPHRAGMATIC HERNIA—REPORT OF FIVE CASES.

By JOHN D. S. DAVIS, M.D., Birmingham, Ala.

The author reported five cases of traumatic diaphragmatic hernia. The first was seen four days after being injured. On November 15, 1903, a fireman was strained while holding a water hose nozzle up on a ladder. He felt faint and was lowered to the ground and sent to the St. Vincent Hospital, where the author saw him four days later. The patient was in great agony. Left chest dull, heart displaced to the right, and abdomen rigid. He could retain nothing on the stomach and died an hour later. Post mortem revealed a rent in the diaphragm, with the entire stomach and part of transverse colon in the pleural cavity.

The second case was seen at Dr. R. M. Cunningham's private hospital in Ensley, on September 20, 1904. The patient was a large man who had been stabbed in the left side between the eighth and ninth ribs, through the costo-diaphragmatic sinus. A section of omentum was protruding from the chest wound. Under ether the wound was enlarged and the eighth rib cut in two places, about four inches apart, so that the flap could be elevated. The transverse colon and omentum had protruded through a two-inch incision in the diaphragm. The colon and omentum were replaced and the diaphragm closed with interrupted silk sutures. The chest was closed with interrupted wormgut sutures with cigarette drain. For fear all the abdominal organs had not escaped injury, the patient was turned on his back and the abdomen opened through the right rectus muscle. A little blood was removed with moist gauze sponges. No injury to the abdominal viscera was found. The abdominal wound was closed in layers with catgut sutures. Patient made a good recovery.

The third case was a negro weighing about 180 pounds, admitted to the Hillman Hospital, October 15, 1905, who had been stabbed in the left side and thrown off of a running car. He was received at the hospital in a state of slight shock with dullness over the left thorax to the fifth rib. The stab was between the eighth and ninth ribs. The man was given ether and the wound enlarged for six inches, through which the eighth rib was cut at two points six inches apart, and the flap lifted. A part of the stomach, transverse colon and omentum were found protruding through the diaphragmatic incision, about four times as large as the skin wound. The stomach which had been cut slipped back into the abdomen before it could be sutured. The transverse colon and omentum were replaced and the diaphragm closed with interrupted No. 2 catgut sutures. A small cigarette drain was placed in the chest, which was closed with through and through wormgut sutures. The patient was then turned on his back and the abdomen opened through the right rectus muscle above the umbilicus. The wound in the stomach was sutured with a double row of continuous Lembert silk sutures, and the small amount of blood mopped out. The abdomen was then closed with tier catgut sutures, with cigarette drain in the lower end of the incision. Drainage was removed from the abdomen on the second day and from the thorax on the fourth day. Patient made a good recovery.

The fourth case was admitted to the Davis Infirmary, January 10, 1907, with the history of hav-

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ing been cut in the left chest and in the right side of the abdomen during a fight. After receiving the cuts the man continued to fight until he fell from exhaustion. He was brought to the infirmary two hours later and placed on the operating table. A wound was found in the left chest between seventh and eighth ribs near the posterior axillary line, and a stab wound in the abdomen just above the umbilicus on the right side. An incision was made through the seventh intercostal space for exploration, and the stomach was found in the pleural cavity. The incision was increased to about six inches and the seventh and eighth ribs were cut in front and behind. Retraction of the wound gave a good view of the stomach, which was carefully examined and replaced. The incision in the diaphragm, about two inches long, was closed with No. 2 catgut sutures. The chest was closed with interrupted wormgut sutures without drainage. The patient was then turned on his back and the abdomen opened through the right rectus, extending two inches above and one inch below the umbilicus. A cut was found in the transverse colon and a little blood in the abdomen. The cut in transverse colon was closed with a double row of continuous Lembert silk sutures and the blood mopped out with moist gauze sponges. The abdomen was closed with tier catgut sutures. Patient did well until the sixth day when he had a chill and the temperature ran up to 104; pulse 120. A suture was cut in the posterior portion of the chest wound and a pair of forceps introduced and opened, when a lot of bloody serum flowed out. A small rubber drainage tube was introduced and continued for a week. Patient continued to have fever for five days, when it disappeared and he got well.

The fifth case was a male of medium size who came into the Hillman Hospital, December 9, 1914, with two cuts in the chest. One stab was received to the left of the nipple between the fifth and sixth ribs, and the other through the eighth rib on a line with the inferior angle of the scapula. Through the second wound a portion of omentum was protruding. One of the internes, after cleansing the chest with iodin, tied off the omentum and reduced it, and mopped the wound with iodin. He then packed the wound with iodoform gauze and covered both wounds with a sterile dressing. On December 11, 1914, the patient was prepared for operation in the clinic of the author. He was placed on his right side, and under ether the eighth rib was resected, making a flap with the base above, according to Cranwell's method. The diaphragm had been opened two and one-half inches, through which a large portion of omentum and a section of the colon had protruded. The omentum and colon were reduced and the opening in the diaphragm was closed with No. 2 catgut sutures. A small cigarette drain was placed in the lower angle of the wound, and the chest closed with buried catgut sutures, except the skin which was united with interrupted wormgut sutures. Had the patient been operated on the first day he arrived in the hospital, the abdomen would have been opened as a precaution for possible visceral injury. But three days later he had no evidence of this; the abdomen was relaxed. He had been on a regular diet, and so it was concluded that he had sustained no injury to any of the abdominal viscera. Patient is doing well.

When an operation is decided upon, the question arises which is the best route to follow? If the abdominal route is selected, it is not at all easy to reach the wounded diaphragm. Prolonged and difficult maneuvers are required to bring the wound into view; if it should be found necessary to enlarge the opening, the task will prove difficult of accomplishment by way of the abdomen; and it will be found exceedingly difficult by this route to apply sutures to the diaphragm.

The thoracic route presents great advantages. It has one decided merit in injuries of chest—that the external wound itself serves as a guide. The chest is to be opened at the site of the wound, and the course of the wound followed. Further, this is the most direct route; it affords space for reducing the hernia if one is found to exist, and for enlarging the diaphragmatic wound and treating the hernia. There are two objections to thoracotomy. The first is danger of pneumothorax. The second is that the route does not permit exploration of the peritoneum and its contents. This objection is valid in regard to those cases in which it is necessary to repair injuries and remove from the peritoneal cavity intestinal contents and blood. In the cases in which it is important to ascertain what viscera, if any, have been wounded, an abdominal section is necessary. No hard and fast rules are to be made for surgical procedures; each case should be approached accord-

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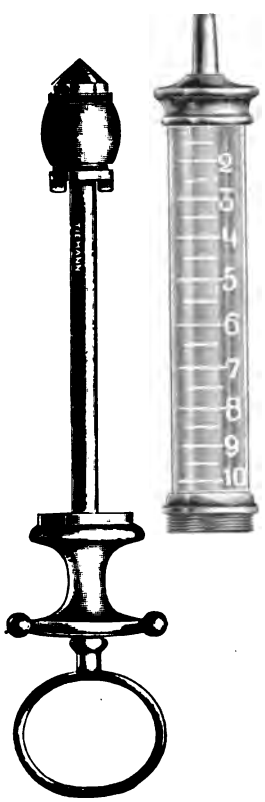
ing to its individual features; but from observations of the author the superiority of the transpleural route in the treatment of thoracico-abdominal wounds seems to be indisputably established. A regular technic is difficult to establish because of the great variations of the wound. The author recommends, as a rule, Cranwell's trap-door opening with the base above. Resection of one rib, however, is certainly often sufficient, and it is seldom that the incision need extend above the eighth rib in front or the seventh behind.

A NEW SYRINGE FOR LOCAL ANESTHESIA.

By CHARLES GOODMAN, M.D., F.A.C.S.

The increased satisfaction of recent years in the use of local anesthesia has caused the instrument makers to place on the market syringes of various designs and description.

Since the introduction of the synthetic preparations of novocain with L-suprarenin, with their decidedly diminished toxicity, as compared with cocain, the infiltration method of anesthesia has justly become popularized.



Its almost unlimited field of application in the domain of major surgery, without the danger and disagreeable after-effects which usually follow the administration of a general anesthetic, has caused it to become, in some clinics, the method of choice rather than necessity.

Through George Tiemann & Company I have had a syringe constructed possessing the various advantages of those already on the market, while the features which have contributed difficulties have been eliminated. The syringe has a glass barrel accurately graduated; this affords the operator the visual assurance that the solution in appearance and quantity is as he desires. The plunger is made of rubber and can be adjusted to a nicety without removing it from the barrel; the syringe can also be boiled without withdrawing the plunger, obviating the delay experienced with other glass syringes. The capacity of the barrel is exactly 10 cc., the instrument is light in weight and beautifully proportioned, which renders it easy and ready of application.

The piston has a thumb-ring atached, while the finger rest is provided with two projecting knobs, preventing its slipping while being used.

The ingenious little needle carrier devised by Braun fits readily to the syringe.

PITUITRIN IN THIRTY CASES OF LABOR.

By J. F. BELL, M.D., Weldon, Ark.

Pituitrin, or pituitary infundibular extract, is becoming generally accepted as a valuable aid to the obstetrician. I have used it in thirty cases and in every instance it has worked wonders for me. I usually give it after the second stage has developed; however, if the first stage is long and threatens much worry to the patient, I don't hesitate to administer it then, and if I fail to get the desired effect I repeat the injection in one hour. This always has brought about satisfactory results, and in from ten minutes to two hours the baby is born.

I have never had to deal with after pains nor post-partum hemorrhage in a single case since I began the use of pituitrin. It is harmless, and in the event that the pains are too hard and endanger the uterus a few whiffs of chloroform will stop this.

As an aid in eclampsia it is not surpassed. I was called to see Mrs. N. C. at six o'clock in the morning. She informed me she had been in labor about

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two hours, felt well and had enjoyed the best night's rest she had had in several months. On examination I found the os dilated about the size of a five-cent piece, and that she was having irregular pains, very light in character. I had advised her the evening before to take salts the next morning before breakfast, and this she had done with good results. After learning this I assured her husband that everything was all right and that we would give her plenty of time, inasmuch as this was her first child, when, like a flash of lightning, she had a convulsion. I immediately gave her 1-2 gr. morphin hypodermically and an enema of 20 grs. each of bromide of potassium and chloral hydrate. Within a few minutes I administered 1 c.c. pituitrin, for it was impossible for me to make a forceps delivery with almost no dilatation. In thirty minutes I repeated the pituitrin and in less than one hour the fetus was well down and within easy reach. I delivered by forceps without chloroform, since the patient had not regained consciousness. The baby was not injured, and the mother soon awoke and thanked me for the painless delivery. She made a quick recovery and both mother and child are doing well. Pituitrin saved artificial dilatation which is very slow at times, and time counts in eclampsia.

AN INTERESTING RESULT WITH NEOSALVARSAN.

By Lanning E. Likes, M.D., Lamar, Colo.

Mr. M., aged 24, came to me December 12, 1913, seeking relief for severe leg ulcer. For the past five months it had been treated as a varicose ulcer with but little benefit. The granulations were large, deep red in color, and bled readily when touched, and were slightly elevated above the skin. The surrounding zone was swollen and edematous and of a deep purple color. The ulcer was about 5 inches above the external malleolus. The patient was in a desperate condition and had lost about 25 pounds in weight; he was constipated, had marked gastro-intestinal disturbance and was very anemic. Hemoglobin, 70 per cent.; red blood cells, 2,700,000; whites, 11,200. The patient was put to bed, the bowels regulated, and general tonic treatment instituted. He denied syphilis; his wife and two children are healthy. Because of the varicosity and the characteristic ulceration, with the negative history, I treated it as a varicose ulcer, and the results were far from gratifying. I therefore decided to try the therapeutic test: biniodide of mercury, 1-12 gr., t.i.d., with 60 grs. of potassium iodide t.i.d. This was kept up for three weeks and at the end of this time the leg was in worse condition than when first seen. I was very much interested in the case, and had a Wassermann test made, which was strongly positive. Convinced that I had given the sheet anchors, mercury and iodides, a fair trial without any benefit, on January 15, 1914, I gave 0.6 gram of neo-salvarsan intravenously, and in three days the swelling and purple color had disappeared and the ulcer was rapidly healing. One week after the first injection, a second dose of 0.9 gram was given intravenously, and what the first failed to do, the second dose accomplished, and today the patient is most grateful, having made a complete recovery and gained 13 pounds in weight.

SURGICAL ITEMS.

I cannot favor the common use of local anesthesia in abdominal work for the reason that no thorough exploration of the abdomen can be made with it, and incomplete and unfinished surgery must result from its use. For one properly equipped to do major surgery abdominal section with local anesthesia offers a valuable means of treatment for some eclamptic women.—Dr. H. R. Shands (*Southern Med. Jour.*).

The too frequent custom of carrying a patient to the operating room half an hour or more before the time and leaving him there practically unnoticed while preparations are being made, cannot be too severely condemned. It is the most trying part of the ordeal. And a surgical operation *is* an ordeal to the average patient.—Dr. W. P. Carr (*Va. Med. Semi-Mo.*).

Fractures of long bones are reduced promptly when discovered; why should there be any delay when the skull is concerned. It is imperative that deformities of the cranial bones shall be accurately corrected, leaving a smooth surface to cover the dura in order that the dreaded sequelæ may not develop.—Dr. F. Y. Cronk (*Southern Med. Jour.*).

It has been thought that a low absolute count in suppurative appendicitis is a bad prognostic sign, but we have not found this to be a fact, and have come to the conclusion, from the study of our cases, that the absolute count in its relation to the differential count is of no prognostic value.—Dr. A. P. Condon (*Western Med. Rev.*).

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Though not required for publication, all communications must contain the author's name and address, otherwise no attention will be paid to them.

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Editorial Department

NEW YORK, APRIL, 1915

MEAT-EATING AND APPENDICITIS.

In the immense literature on appendicitis comparatively little is to be found on the subject of its etiology, and even this is largely based on theory rather than definitely established facts. Essentially the disease is to be considered as an infection of a rudimentary organ ill equipped by reason of its anatomical peculiarities to resist the inroads of bacteria. The narrow lumen of the appendix, its scanty muscular coat, and the displacement and distortions to which it is frequently subjected by intestinal bands and adhesions favor the stagnation of secretions and fecal matter in its interior, and thus establish conditions predisposing to infection and inflammation. While the bacillus coli seems to be the chief offender, various other bacteria, such as the influenza and typhoid bacillus, the pneumococcus and the pus germs may be concerned in the causation of appendicitis. Bearing in mind that the disease is of microbial origin, and particularly due to the bacillus coli, how can its undoubted increase be best explained? For even after making due allowance for the greater number of cases that are nowadays recognized owing to greater accuracy in diagnosis, the fact remains that appendicitis is of more frequent occurrence than in former years, and particularly in the larger cities. In seeking for an explanation it is reasonable to assume that the prevalence of the disease must be due to some factor which increases bacterial activity in the intestinal canal, and there is nothing which exerts so profound an influence in this respect as diet. But, it will be asked, has there been any change in the dietary during recent years sufficient to act as a predisposing cause of appendiceal infection? According to D. P. D. Wilkie (*British Medical Journal*) the increased consumption of meat among the English working class, due to the rise in wages, is responsible for the greater frequency of appendicitis, and especially the severe form, in large industrial areas. The same observation has been made in Germany,

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and it has also been noted that the disease is relatively much more frequently met with among town dwellers than among the peasant class. Wilkie further calls attention to the comparative rarity of acute and fatal cases of appendicitis among Eastern peoples, who subsist largely on a vegetarian diet, such as the Roumanian peasants and the Turks. His own experiments on animals afford strong corroborative evidence of the correctness of his views. Thus he found that if the appendix was artificially obstructed so as to be partially filled with fecal matter, changes of a gangrenous putrefactive type were far more apt to follow in protein-fed than in carbohydrate-fed animals, and practically the same result has been obtained by Heile. Wilkie believes that similar changes take place in the human appendix as the result of obstruction with fecal matter consisting largely of proteids, and he therefore considers the urgent gangrenous type of acute appendicitis to be of the nature of acute appendicular obstruction and as a disease of meat-eating nations.

If we accept these conclusions it is not difficult to understand why appendicitis is so common in our own country where the people indulge so greatly in a meat diet. There is no doubt that animal foods are more prone to give rise to digestive disturbances and putrefactive processes in the intestines than those of a vegetable nature, and that such conditions constitute important predisposing causes of appendicitis. Let us therefore give serious consideration to Wilkie's suggestion, that "in a bulky and mainly vegetable diet lies the chief safeguard against acute appendicular disease in its most severe and dangerous forms."

A PLEA FOR NON-OPERATIVE TREATMENT OF FRACTURES.

In the clamor raised by the enthusiastic advocates of routine operative methods for the treatment of fractures, little heed has been given to the protests of conservative surgeons who failed to be impressed with the necessity of such radical intervention in the average case. But now that a reaction is setting in their voices are being heard. When so experienced a surgeon as Dr. W. P. Carr, of Washington (*Va. Medic. Semi-Monthly*), tells us that the general treatment of fractures has not been as good during the past few years as it was fifteen or twenty years ago, and that the too frequent and ready resort to open operation, and particularly to the use of plates and other devices, has increased the number of cases of delayed or non-union, infections, amputations, and even deaths, it is time to take notice. He has had frequent occasion to remove Lane plates applied by others, and believes alignment can always be maintained by splints or plaster casts. The only legitimate use for any foreign body in the bone, in his opinion, is to prevent shortening or to hold down the end of some short fragment tilted out of place by muscular action, the least harmful thing for this purpose being a short wire loop of silver or soft iron. According to Dr. Carr, therefore, few cases will require operation except fractures of the patella, olecranon, some comminuted fractures about the elbow and knee, fracture of the anatomical neck of the humerus, and a few rare cases where fragments are caught under muscles and cannot be otherwise dislodged. Dr. A. R. Shands, of Washington, the well-known orthopedic surgeon, is equally emphatic in his condemnation of promiscuous operating on fractures, his chief objection being the risk of sepsis in spite of the greatest care. He believes that if one will study well his case and use his best efforts at reduction by manipulation with traction and counter-traction, if indicated, but few cases will require operation. As to Lane's plate, his experience has been limited to its removal from patients who had been operated on by other surgeons with varying degrees of bad results. In his own operative work he employs absorbable sutures, wire or spikes, but makes it a point to leave as little foreign material in the wound as possible. Another valuable suggestion is never to be in a hurry to operate in simple fracture, since a delay of a few weeks affords time for improving the technic of reduction and for sufficient x-ray examination, besides enabling the traumatized tissue to return to a practically normal condition.

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Department of Railway Surgery

OFFICIAL ORGAN

THE ASSOCIATION OF SURGEONS OF THE SOUTHERN RAILWAY.
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ASSOCIATION OF SURGEONS OF THE SEABOARD AIR LINE RAILWAY.

ASSOCIATION OF SURGEONS OF SOUTHERN RAILWAY.

The twentieth annual meeting of this Association will be held at the Battery Park Hotel, Asheville, N. C., June 2, 3 and 4, 1915. We are in receipt of the following communication from the Secretary and Treasurer, Dr. J. U. Ray:

PRELIMINARY PROGRAM.

It is the intention to make the coming program one of *strictly* railroad injuries and railroad surgery. Any surgeon having a case of interest is earnestly requested to report same. Please send in the title of your paper *at once,* as it requires considerable time to arrange the final program.

The following titles have been received:

"Shock After Accident and After Operation," Surgeon L. B. Etheridge, Wagner, S. C.

"Report of an Interesting Case of Lacerated and Contused Wounds Caused by Hand Car," Surgeon J. R. Carroll, Henderson, Tenn.

"Crushed Foot, with Report of Cases," Surgeon F. A. Webb, Calvert, Ala.

"Surgical Judgment in Accident Cases, with Illustrations," Surgeon H. P. Cole, Mobile, Ala.

"Some Types of Cases Seen in the Course of a Railway Surgeon's Life," Surgeon T. E. Anderson, Statesville, N. C.

"Fracture of Fibula, with Report of Case," Surgeon Joel Crawford, Yale, Va.

"Emphysematous Gangrene Following Crushed Injuries," Surgeon H. A. Gamble, Greenville, Miss.

"An Interesting Case of Gunshot Wound Occurring in Railroad Practice," Surgeon A. W. Rudisill, Memphis, Tenn.

"Fracture of the Hip," Surgeon E. G. Givahn, Montevallo, Ala.

"Amputation of the Thigh," Surgeon B. M. Titts-worth, Jefferson City, Tenn.

"Traumatic Abscess," Surgeon L. J. Blake, Spartanburg, S. C.

"The First Aid to the Injured," Surgeon A. T. Finch, Chase City, Va.

The officials of the Southern Railway and allied lines are very much interested in the success of this Association, and desire that the local surgeons show their interest in the work *by attending the annual meetings,* reading and discussing papers and reporting cases that are of mutual benefit to the surgeons and the railway company.

A great many of the members have failed to send in their photographs, and, to make the exhibition complete, all should comply with the resolution in regard to autographs and photographs as per resolution 9, page 15 of the By-Laws.

Last year a great many members were slow in sending in their annual dues—$3.00. Some of them were over in Europe and did not receive my communications in regard to this matter. This year more than usual are in arrears, and it is questionable if they are in Europe; at any rate, they do not respond to requests for their dues. I hope everyone who has not paid for 1914 will do so at once, so that I may close my accounts for the past year.

If any desire to pay dues before the meeting I will be glad to mail them receipts, as it will save time at the convention.

The steady improvement of each annual meeting over the previous one will be in evidence this year, and I hope that each member will appreciate the importance of his being present and taking an active part in the work of the Association.

OFFICERS: Surgeon H. T. Bahnson, president, Winston-Salem, N. C. Surgeon W. H. Taylor, first vice-president, New Market, Tenn. Surgeon W. G. White, second vice-president, Yorkville, S. C. Surgeon M. N. Stow, third vice-president, Jesup, Ga. Surgeon W. A. Monroe, fourth vice-president, Sanford, N. C. Surgeon George Ross, historian, Richmond, Va. Surgeon J. U. Ray, secretary-treasurer, Woodstock, Ala.

J. U. RAY,
Secretary and Treasurer.

NOTICE.

Special attention is directed to our May issue, which will contain articles on the more common diseases of the rectum and on minor rectal surgery by prominent surgeons and proctologists.

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THE PREVENTION AND TREATMENT OF POSTOPERATIVE SHOCK.*

By S. R. Parker, M.D., Ethelville, Ala.

Shock is a danger common to all operations. It is a condition of general vital depression induced by paralysis of the vasomotor centers; but although the nervous system is primarily involved, the manifestations of shock are by no means confined thereto, all the tissues and organs of the body being affected in sympathy with the part injured, and especially the circulatory system.

Surgical shock is to be distinguished from mental shock as caused by grief, fear, anger terror and such emotions. The differentiation is easily determined by the injury itself and the symptoms—the extreme pallor, the coolness of the face and body surface, the small, slow and feeble pulse, the irregular and infrequent respiration, the drawn and pinched features, the lowered temperature, the cold sweats and the appearance of dissolution.

Shock may be of any degree of intensity, from a slight, evanescent and hardly appreciable disturbance of mental force to profound general delirium, with hiccough and convulsions, a total suspension of the ganglionic or central nerve power and speedy death. In shock the degree of the depression depends upon the situation of the wound or injury, the constitution of the individual, his idiosyncrasy and age. This last, though but a relative term, is the most important factor to be considered in estimating the probable severity of shock. Children suffer less from shock than adults; women less than men, and they react more readily. The young bear their injuries well and rally more quickly when there is no great loss of blood.

We must also keep in mind that the same injury will produce different degrees of shock in different persons, or even in the same person at different times. This is in accordance with the physical and mental state of the individual. Thus fear, despair, despondency, disappointment, grief, and mental worry aggravate the danger of shock, while hope, joy, cheerfulness, glad expectations and success diminish it. Those who have suffered much pain or have been confined to their beds for a long period, as well the habitual users of such drugs as the opiates, on account of their dull nerve susceptibility, are less liable to shock than those whose nerves are in a high state of sensibility and activity.

Temperament modifies the manifestations of shock to a marked extent. The phlegmatic, lymphatic temperaments resist shock, while the sanguine and mobile are susceptible in the highest degree. In the aged, or in anyone, in fact, the presence of organic derangements renders it more severe and prolonged. Shock, associated with traumatic delirium, is such a serious condition that no operation, except such as is absolutely necessary, as for instance, the arrest of hemorrhage or the relief of strangulated hernia, should be undertaken.

The conclusion of Crile, that shock is a condition depending upon exhaustion of the vasomotor center is strongly opposed by Porter and others, who say the symptoms are really due to inhibition of the heart. This, however, I shall not discuss in this article, but rather the measures to prevent shock and its treatment when it has occurred.

The pathology of shock cannot be determined by the ordinary methods of research. In deaths from it the post-mortem examinations show no changes in any of the tissues, the effects having manifested themselves chiefly through the agency of the nervous system, as in all vital phenomena which are under the control of that system.

In view of the foregoing observations the measures for the prevention of shock in operative surgery are apparent. Every precaution must be taken to prevent shock. We must learn all we can of the patient, his life history, his temperament and his habits—whether he uses alcohol or other drugs and, if so, to what extent; whether he has had any venereal disease, and if so, whether he is free from its effects; whether or not there is a lesion of any organ, especially of the lungs, heart, liver or kidneys, and should we suspect the last, we should by all means examine the urine, both chemically and microscopically, before performing the operation.

Should there not be an immediate necessity for the operation we should treat the patient for a few days beforehand—an entire week is best in most cases, as we then get to know more of him and win his confidence, when he will tell us many things of his own accord which otherwise he

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would keep concealed. By thus keeping the patient under our observation, by giving him tonics for his general health, seeing that the emunctories are all properly performing their functions, and by the rest itself (as a nerve sedative) we can get the case in such shape that there will generally be but slight risk of shock.

This preliminary treatment is of especial value in those cases where the patient is of a highly nervous and irritable disposition with dread of the operation, as we can thus allay his fears and assure him that there is little danger and practically no suffering in modern aseptic surgery. The patient being in proper condition for an operation, he should be led in every way to believe that the surgical efforts will meet with success, and nothing but hope of relief and joyful expectations should be held out to him, even though we ourselves may have but little hope of success, and so inform his family and friends.

For the operation itself, we should choose that period of the day when the patient's vital forces are at their best, and that is, as a general thing, in the early morning hours.

We should avoid any further exposure of the body than is necessary, as cold increases shock and the danger therefrom, and particularly so if the operation is to be long and tedious. The operating room should have a warm, stable, equable temperature. Morphin and atropin should be administered one-half to one hour before the operation; the morphin to quiet the nerves, as under its influence the patient seems to yield to the anesthetic easier and more quickly; while atropin is given as a general stimulant and also to diminish, in a large measure, the bronchial secretions which are frequently so troublesome. In a person of extreme nervous temperament it is often advisable to administer ammonia as a diffusible stimulant, before the operation.

Should the patient be malarial or syphilitic we should treat him for these diseases, if possible, before operation. Many surgeons give a few doses of quinine as a general tonic and stimulant in all cases before operating.

The administration of the anesthetic is fully as important as the operation itself, if not more so, as properly given, the danger both of, and from, shock is generally lessened. The anesthetic should be administered with great caution, and by an experienced man. We must avoid the depressing effects of too profound anesthesia, but at the same time render it complete, as when semi-anesthetized, the patient is even more susceptible to shock than when entirely conscious.

The surgeon, while avoiding undue haste, should operate as speedily as possible, for, as a general rule, the shorter the operation, the less the risk of shock.

After anesthesia has been fully induced, strychnin should be given hypodermically in full dosage, 1-20 to 1-10 gr., both as a preventative of shock and for its stimulating action upon the cerebrospinal centers.

Shock having become established, prompt and vigorous action is required by the surgeon. The operation must be finished with all possible dispatch, and in some severe cases it may be even necessary to suspend it entirely to save the life of the patient. The head must be lowered, the body at once placed in recumbent position (if it is not so already), the respiration be maintained or artificial respiration practised, and for this purpose the administration of oxygen gives the best results. Heat should be applied, not alone to the extremities, but to the whole surface. A quick and efficacious method of applying heat is to envelop the entire body in blankets soaked in hot water and wrung out.

Of course, if the operation be a serious one, hot water bags and bottles have been already applied to the surface of the body, and if shock should occur, these should be renewed repeatedly. Hypodermic injections of whiskey or brandy should be freely given, in amounts of thirty to sixty minims, until there is a distinct reaction and a fuller, calmer and steadier pulse. Some highly recommend a rectal enema of turpentine made into an emulsion with raw eggs as a stimulant. A warm, strong decoction of coffee given by rectum will frequently be found of much benefit. In atropin and digitalis we have two of our most valuable remedies in sustaining the action of the flagging heart. These are to be given hypodermically—the tincture of digitalis in 15 minim doses every fifteen minutes until the pulse shows its effects. Not more than four such doses should be administered, however, as the effect will appear in that time. We frequently combine with the first dose of digitalis 1-100 gr. atropin, and when the action of the heart becomes more slow

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and regular and the superficial vessels appear to be filling up with blood, we gradually withdraw the stimulant. The pulse must always be carefully watched, and according as it indicates progressive weakness or strength, we again resort to the cardiac stimulants, or discontinue them entirely.

Where there has been much hemorrhage, the copious administration of hot liquids by the stomach and the rectum to the full amount which these organs are able to tolerate, should be resorted to.

I have found adrenalin the most efficacious of all drugs in renewing the heart action when all other means have failed, and sometimes when life itself seems almost extinct. A pint of warm normal salt solution with 30 minims of adrenalin (1-2000) may be injected into the tissues, but it is better given intravenously. Although adrenalin is usually regarded as a dangerous drug, in my experience with it I have met with no ill effects. Some recommend adrenalin in smaller doses, often repeated; its effects, they say, are evanescent and transitory, and they use with it a salt solution stronger than the normal, from the customary 7 per cent. up to 9 or 10 or even 12 per cent. Crile by this method—the slow intravenous injection of the adrenalin, with the supra-normal salt solution—has resuscitated dogs after as long an interval as ten minutes after death, or apparent death (the heart having ceased to beat for that length of time).

The extract of pituitary body is said by some to have an effect analogous to adrenalin and also to act more quickly and to have a more lasting influence.

RAILWAY CRUSHED HAND.*

By W. H. Armstrong, M.D.,
Rogersville, Tenn.

I do not propose to encroach upon the valuable time of this Association by offering a lengthy paper upon the subject I have chosen. I have confined myself to a mere synopsis of ideas in the treatment of such injuries, drawn from the few cases I have had under my care, although the subject deserves a more thorough handling.

To know just how to proceed to conduct this class of injuries to a favorable issue is a problem that has no doubt confronted every surgeon in this Association. My experience in the treatment of such cases has been limited, compared with that of many other members. I therefore hope to get much valuable information from them in regard to the successful management of lacerated, torn and mangled hands which come to you wrapped in filthy, dirty cloths, or more often, in waste material, with grease, dirt and rancid oil ground into them, bones crushed, displaced and driven together, complicating the injury tenfold.

Naturally, three distinct factors confront you:

1st. Necessary operations.

2nd. Disinfection.

3rd. After drainage.

Already you have a septic wound to deal with and, unless you can devise some means to remedy it, you must have suppuration, not local, for the torn sheathes of tendons favor backward drainage of septic material and the formation of secondary abscesses. This is a condition I have had to deal with in a large percentage of the cases that have been under my care, notwithstanding the fact I have in every instance adhered strictly to the teachings of modern science in making every effort to convert the wound into a clean one by removing all crushed bone and washing away the dirt and filth that may be carried into it at the time of the accident with 1 to 3,000 bichloride solution. With injuries of this character you necessarily have some hemorrhage, which is a natural preventative against infection by sealing up with fibrin the open mouths of bloodvessels. The serum protects the open lymph vessels, guarding the whole wound from the infection present in the surrounding surfaces, ready to enter, and which the patient seemed determined should enter by the applications he has already made to it. The blood also washes away those germs that may have entered at the time of production of the wound. It is a self-evident fact that washing or attempts to cleanse the wound cannot be resorted to without the possibility of pus germs getting into the bruised and wounded tissue and being carried into the deep channels, and you have no assurance that your antiseptic washes have rendered the wound a clean one. Therefore, I want to ask this Association if it would not be just as well to not materially disturb this effusion of blood and allow it to protect the wounded surface, thus destroying whatever infective material there may be in the field before

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there is a chance for it to gain entrance into the deeper structures, when the mouths of the vessels are torn open and the circulation accelerated during this first process of inflammation. I do not mean that, no matter what condition of filth or dirt a hand may be in, no cleansing agents should be used previous to the initial dressing. This would convey a wrong impression. With a wet sponge, endeavor to remove all the filth you can without disturbing the wound; in other words, with washes into the deeper structures you detach and break loose the blood clot already formed there. These are the points I hope to bring before you for your consideration.

But you might ask, why? After washing a wound of this character with tincture of green soap, followed by 1 to 3,000 bichloride of mercury, are we not sure of an antiseptic condition in the wound? No, for during the cleansing process in a badly mangled and crushed hand the fluid finds its way into channels which, owing to the slight movement necessitated by the washing, become closed to the antiseptic solution afterwards used, which therefore never comes into direct contact, so that there remain locked foci for future trouble that possibly did not exist. We have no absolute certainty of the total destruction of germs by any cleaning process; therefore, the wound is left in a more uncertain condition than before the removal of nature's antiseptic, which came from the freshly opened vessels to protect the whole field against germ action; besides you have removed the clots already formed. When cleansing can be done without touching the injured part, it should be done with a hot bichloride solution poured over it to destroy any germs on the surface, and the solution will find its way into any cracks or crevices not filled with blood. Then put up in a moist antiseptic dressing. Just how much healthy tissue is left in these injuries it is hard to determine; it may appear healthy to even the most experienced eye, and later you may find that arteries have been crushed or twisted far from the injured part as effectively as if it had been torn away.

So useful is one finger, or even a part of the finger, that we refrain from a knife so long as there is a chance of saving it; therefore, remove only what is absolutely necessary—shreds of tissue and splinters of bone—smoothing up the rough edges. The rest should be left after placing the parts in proper condition for nature to reject what is destroyed in the future, and this cannot be foretold until the second or third dressing. Treated in this manner, nature in a few days manifests her limits of preservation, our purpose being simply to keep the wound clean and pure during the process of sloughing, not so much to protect it from microbic influences as from malnutrition, and to stimulate the formation of granulation tissue.

Now, as to drainage: When flaps are taken from healthy tissue, immediate closure should be attempted, but in the character of wounds I am now discussing, this is seldom the case. While a recent wound may present a healthy appearance, yet sloughing from interference with arterial supply may be inevitable. In such cases, in anticipation of pus formation, which may occur along the tendons, the wound should be left open, not only to favor drainage, but for more thorough application of antiseptic solutions. Am I right or am I wrong?

TREATMENT OF FRACTURES DUE TO RAILWAY ACCIDENTS.*

By B. F. IDEN, M.D., Manassas, Va.

When invited to read a paper at this meeting I hesitated some time before accepting, not because I was unmindful or unappreciative of the honor paid me, but because the greatest difficulty confronted me in choosing some subject that had not already been exhausted and yet would be interesting and justify me in consuming your time.

Appreciating the trials and difficulties of railway surgeons I have selected for my subject, "The Treatment of Fractures Due to Railway Accidents," with the hope that I may be able to invite your attention to a few points that are worthy of note and of your consideration.

The topic chosen is so extensive that I shall confine myself mainly to the treatment of simple and compound fractures by the local surgeon.

In considering the treatment of fractures resulting from accidents on railways both to employees of the company and to passengers, it seems to me the surgeon should be strongly imbued with the fact that his obligation and duty are twofold, namely, to the injured and to the company employing him.

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It is a noteworthy fact that many persons otherwise honest consider it perfectly legitimate to magnify any injury, however slight, and claim permanent or partial disability, if by so doing it enables them to recover damages. In the minds of many people there is nothing dishonest in forcing the government or a corporation to pay them large sums of money for an imagined or trivial injury, and on the other hand there are many who are plain malingerers.

This latter class may receive some injury which the attending railway surgeon examines and diagnoses as a simple sprain, not deeming it necessary to further assure himself of the absence of a fracture by x-ray examination, with the result that the injured one may fall into the hands of an unscrupulous physician, who puts the part up in a cast and for a consideration stands ready to testify that there was a fracture, or there may have been a fracture with improper treatment and consequent deformity which would constitute sufficient grounds for suit.

With the x-ray at our disposal there is absolutely no excuse for such mistakes, even though the attending surgeon might possibly be incompetent and appointed through influence only. Its value in the diagnosis and treatment of fractures has been aptly expressed by Cotton, who says: "The greatest direct service of the x-ray, in my opinion, has been that it has given us a clearer idea of the lesions in ordinary fractures, and has cleared up the pathology of various less usual fractures that previously were obscure."

The treatment of either simple or compound fractures by the local surgeon must necessarily be first-aid in character, and here it is that either much good or great harm can be done. The proper temporary fixation of the limb, the mode of transportation and removal of clothing require skill and judgment. Intelligent treatment during the first hours after an injury promotes the comfort of the patient and correct union of the fracture.

The best time, in general, for the reduction of a simple fracture is immediately after the accident, provided the patient's general condition will permit it, and this should not be attempted without giving an anesthetic. It is extremely difficult to reduce any fracture without it on account of the pain and great muscular contraction.

Even if the conditions are such that the immediate and after treatment of the injured person must be outside of a hospital, in my opinion it is an injustice to both the patient and the railway company to attempt to reduce any fracture without first giving an anesthetic. I cannot, however, emphasize too strongly the great importance of never attempting, with or without an anesthetic, the reduction of fractures at the scene of accident where the surroundings are doubtful. Both the patient's skin and the surgeon's hands are soiled, with no adequate facilities for cleaning either or for immobilizing the part, and in addition we are probably surrounded by a crowd filled with morbid curiosity.

In this class of cases I desire to invite especial attention to the danger of using circular plaster casts as a primary dressing on account of the danger of gangrene from pressure upon the rapidly increasing swelling which occurs in the first week. In case it is decided to use the plaster-of-Paris bandage, a strip of tin should be inserted along one side between the skin and the cast, which soon after its application is cut along the line of the tin. Better still, I believe, is the moulded plaster splint which has all of the advantages of the circular without its danger. I remember well a case of simple fracture of the thigh in which a young inexperienced man applied a circular cast immediately after the accident and gangrene resulted. Later I was called in and amputated the limb, but the patient was so far gone that she died in shock.

It is very true that we learn more from our mistakes than from our successes, but fortunate is he who profits by the mistakes of others and is spared the humiliation and suffering caused by his own.

Some surgeons, like Lane, Koenig and others advise operative interference in every case of simple fracture in which there is much displacement, but it goes without saying that this should never be attempted outside of a well-equipped hospital and by the most skilful and experienced men, because no class of operations require a more perfect degree of asepsis than those upon fractures.

If the first aid treatment of simple fractures is important, how much more so is that of compound?

I believe you will agree with me that many compound fractures are not infected when first seen, but become so later through meddlesome interference. Assuming this statement to be true, we see at once what an important part the local surgeon plays and

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how much depends upon him as to the final result, no matter to how well-equipped a hospital the patient may be removed. Still, at the present time, it is the universally accepted opinion of all surgeons, that even though every compound fracture may be regarded as an infected wound, in the majority of cases the local reaction will overcome the infection unless it is of a very virulent type.

There is more and more of a tendency to treat them as simple fractures after disinfection of the skin and application of an occlusive dressing.

During the past few years little change has taken place in the management of compound fractures. The keynote of our treatment should be conservatism. Instead of the elaborate methods of disinfection formerly used it is safe and quite sufficient to apply tincture of iodine directly to the skin and sterile first aid dressings with some form of immobilization, and the patient is then sent to a hospital.

In case it becomes necessary to treat such a case in a private house, immobilization, extension and treating the wound as an open one is the only course justifiable, for even if the advantages of an up-to-date hospital were available, the use of Lane bone-plates or wiring to secure accurate apposition should not be resorted to until at least a week or ten days has elapsed in order to escape the danger of infection which is likely to occur when these strings are used.

If in the great majority of cases, even though infection is already present, the protective agencies of the body will overcome it, it seems to me that it becomes our duty to assist and promote this natural process. How may this be accomplished?

Nothing is more natural than to attempt to destroy the bacteria present by means of the application of dressings soaked with strong antiseptics, even though clinical experience has shown that they are not efficient and retard rather than accelerate the immunizing process locally. We may believe that the effect of devitalizing the tissue in any wound would result in sealing the natural avenues of exit for the lymph and lead finally to stagnation of fluid, and therefore prevent the entrance of a new supply of opsonins. Again it is difficult to imagine that the blood serum and phagocytic cells have any efficient anti-bacterial power when in contact with strong antiseptics.

When the connective tissue cells are stimulated by the specific poison produced by bacteria present, they produce substances known as opsonins. These so affect the bacteria by combination with their cell protoplasm that the phagocytic cells are enabled to ingest those microorganisms with which they come in contact.

We then have in phagocytosis and the opsonins which renders it possible the predominating factors in first defense against infection.

The answer to the question then is to increase the opsonic index, and this can be done by using a dressing kept wet with some fluid that will promote the flow of fresh serum to the point of suspected infection. The sodium citrate and sodium chloride solution devised by Wright meets this requirement, for it prevents coagulation of lymph, crust formation, and consequent cessation of discharge.

The effect of the sodium citrate is to produce precipitation of calcium salts and thus prevent coagulation. The sodium chloride, by osmosis, draws lymph through the wound, thus removing that from which all the opsonins have been used up and allowing a fresh supply laden with others to take its place. Wright's solution is one per cent. sodium citrate and four per cent. sodium chloride. It is always available and easily prepared. For home treatment we take twelve parts sodium citrate and forty-eight parts sodium chloride and order one teaspoonful to a glass of hot water, with which the dressings are kept wet. It is well to cover the surrounding unbroken skin with a protective layer of vaseline, otherwise, on account of the irritating effect of the sodium chloride, pustulation might be induced. This solution should be discontinued after acute infection has subsided, or in other words when the healing process begins, as it tends to maceration and indolence in healing.

Do not understand me to advocate the non-use of antiseptics in all cases, but rather to insist that the continuous employment of strong antiseptics to wounds is not only useless but harmful. In those cases where the wound and surrounding skin are covered with dirt and infected material, both should be thoroughly cleansed with soap and alcohol and then painted with tincture of iodine.

After the iodine has been applied about five minutes and dried, it should be washed off with

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alcohol, and then a large dressing applied and kept wet with Wright's solution. In no case should water be used if we wish to get any antiseptic effect from the iodine, for water swells the epithelial cells, thereby destroying the penetrating powers of the iodine.

The fractured part should of course be immobilized and no operative interference be instituted until all danger of infection has passed, or any infection already present has been overcome.

The use of internal medication will of course depend upon the individual case, as the indication arises and the experience of the attending surgeon suggests, but I believe that antitetanic serum as a prophylactic measure, giving 1,500 to 3,000 units, should be administered in all compound fractures. This serum is now employed as a routine measure in many hospitals.

In conclusion I warn you of the great danger of you yourself infecting compound fractures and the duty you owe to your company and your patient to carefully and intelligently examine all injuries, however slight they may seem, and not to be satisfied until you have exhausted every means available to assure yourself that your diagnosis is correct.

Surgical Gleanings

Gastric and Duodenal Ulcer.—In an article on this subject Dr. Max Einhorn (*Canad. Med. Assoc. Jour.*, February, 1915) states that while the treatment of peptic ulcers is generally a strictly medical one, their sequelæ may require surgical intervention, the indications for which may be formulated as follows: 1. Perforation requires immediate operation. 2. Recurrent profuse hemorrhages (hematemesis or melena or both) endangering the life of the patient require a prophylactic interval-operation. 3. Frequent small hemorrhages, not being influenced by rational treatment, leading to an appreciable degree of constant anemia, demand operative intervention. 4. Cases with constant continuous hypersecretion, accompanied by intercurrent ischochymia, not yielding to treatment, should likewise be operated. 5. Severe pains, not influenced to a considerable extent by a repeated course of rational medical treatment, form a strong indication for operative measures. 6. Strictures of the pylorus leading to ischochymia are greatly benefited by surgical intervention (gastro-enterostomy). Beginning benign stenosis of the pylorus can, however, also be treated tentatively by stretching. 7. Ulcer accompanied by tumor-formation and suspected malignancy should likewise be operated.

Acute Pyelitis in Children.—Dr. E. J. Wood (*Arch. of Pediat.*, March, 1915) states that acute pyelitis is being frequently overlooked in infancy because of the neglect of routine microscopic urinary examinations in all cases, but especially when there is obscure fever. While the condition is more frequent in female children, still there are many cases in males which are overlooked. The theory that acute pyelitis is always an ascending infection with the colon bacillus from the soiling of the vulva is losing its hold and other sources, as infection from the colon by way of the lymphatics, is gaining ground. Acute pyelitis is often primary and does not necessarily follow one of the acute infections. Malaria and typhoid are often diagnosed in this condition. The disease responds promptly to the use of potassium citrate through the rendering of the urine alkaline. Hexamethylene preparations are most disappointing and their use is to be questioned in infancy.

Prognosis of Cancer of the Stomach.—Dr. J. H. Andries (*Jour. Mich. Med. Soc.*, March, 1915) says that formerly a patient who remained well for three years after an operation for gastric cancer was considered cured. The time limit was then extended to five years, although there is no time limit, when the disease may not recur. Nevertheless, the percentage of those remaining well after five years is very large. If cancer develops again after five years, there is no way of determining whether it is a recurrence of the old malady or whether a new and entirely independent focus has originated. The mortality of the operation itself, when cancer has been diagnosed or found upon exploration, should not be an objection to surgical treatment. The success of the operation depends upon the spread of the disease and the time of diagnosis and operation. Statistics on mortality in operating for cancer of the stomach, where death ensues from the operation itself, are 10 per cent., irrespective of the gravity of the cases that were operated upon. This should be an encouragement for the surgical treatment of all cases that have not positively passed the operable stage. The permanence of cure is also in favor of cancer resection, as the chance of life for the three-year period is 36 per cent. and for the five-year period 25 per cent.

Acute Appendicitis and Acute Appendicular Obstruction.—Mr. D. P. D. Wilkie (*Brit. Med. Jour.*, December 5, 1914) states that according to his observations we never meet with a primary acute inflammation of the appendix without a prompt rise of both pulse and temperature. It is the rule, however, in cases of acute appendicular obstruction to have at the outset no appreciable rise of pulse or temperature, and it is ignorance of these important negative signs which has so often led to fatal delay. We must recognize that if acute appendicitis is a serious condition, acute appendicular obstruction is usually more serious, and is the one in which the call for immediate operation is more clamant. From his

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experiments on animals and clinical observations. Wilkie concludes: 1. Two acute pathological processes are met with in the vermiform appendix—acute appendicitis and acute appendicular obstruction. 2. Clinically acute appendicitis is distinguished by the signs of inflammation, there being from the onset a rise in pulse and temperature. Acute appendicular obstruction gives rise to vomiting, colicky pain, and abdominal tenderness, but at the outset to no appreciable rise in pulse or temperature. 3. The changes occurring in an appendix the lumen of which is completely obstructed depend on the presence or absence of fecal matter within its lumen. 4. In experimental obstruction in an artificial appendix the changes vary greatly according to the nature of the diet of the animal previous to the experiment, rich protein diet being associated with much more rapidly destructive changes than carbohydrate. 5. Undigested protein, putrefactive bacteria, and an alkaline reaction together produce rapid gangrene in the walls of the obstructed organ.

Embalmment of Septic Wounds.—Dr. L. Mencière (*Lancet*, Feb. 6, 1915) makes a plea for this method in grave disorganization of limbs caused by rifle or shrapnel bullets or shell fragments. The wound is washed successively with three antiseptics —sublimate 1 in 1000, carbolic acid 1 in 40 and hydrogen peroxide 1 in 3. This is done because all germs, spores and microbes, are not equally sensitive to the three. For the permanent dressing, or embalmment of the wound, he employs a solution of iodoform, guaiacol and eucalyptol, 10 gm. of each, Peru balsam 30 gm. and ether 100 gm. Gauze wicks are soaked in this solution which is also injected into sinuses. The wound is washed successively with the three antiseptics after operation, and this lavage is repeated for three or four days, after which hydrogen peroxide 1 in 3 or 4 is alone used. Dressings are changed daily.

Gunshot Wounds of the Spine.—Prof. O. Marburg and Prof. E. Ranzi (*Wien klin. Wochensch.*, No. 5, 1915) have had an opportunity of observing 35 cases of severe gunshot wounds of the spinal cord, in 12 of which laminectomy was performed. There were two deaths following operation, one on the twelfth and the other on the sixteenth day. From their experience the writers formulate the indications for operative intervention in the following conclusions: 1. Contrary to what obtains in gunshot wounds of the brain, it is advisable to adopt an expectant plan in wounds of the spinal cord until the condition has become stationary. If, however, no change is perceptible after four or five weeks' observation, laminectomy is indicated. 2. This operation is contraindicated in the presence of pulmonary and abdominal complications as well as of severe suppurative processes in the vicinity of the operative field, purulent cystitis and ascending pyelitis. 3. It is permissible if the infection of the urinary tract is of slight character and any bedsores present are granulating and not extending. 4. If the missile penetrates the cord or strikes at a tangent little can be done as compared with wounds inflicted by indirect violence.

Cleft Palate.—In an article on the operative treatment of cleft palate Mr. H. Blakeway (*Lancet*, March 6 and 13, 1915) concludes that Langenbeck's operation (median suture) is still the best for routine use. The question as to the best age for its performance does not admit of precise answer. It is doubtful if any great advantage results from performing it during the first year of life, and it is certain that the prospect of success during the second or third year will often be better. Further delay is not usually necessary, but may in bad cases be advisable. Surgeons who a few years ago were content to operate in the third year or later now often perform median suture on children 1 or 2 years old. The experience of the operator, the width of the cleft, together with the height of the palatal arch and the general health of the child, have all to be considered before a decision is reached. If the condition is complicated by the presence of a harelip, closure of the latter during the first few weeks of life has a valuable effect in causing obliteration of the most anterior part of the cleft.

Regeneration of Cartilage and Bone.—Dr. S. L. Haas (*Surg., Gyn. and Obst.*, November, 1914), who has made a special study of these processes as they occur at the chondrocostal junction, states: 1. The periosteum is directly and actively concerned in the regeneration of bone. In the very early stages the periosteum proliferates to form a cartilaginous tissue, which is later transformed into bone. 2. The exact method of the changes from cartilage to bone cannot be determined. There is considerable evidence in favor of the direct change of the cartilage-cell into the bone-cell. There is at times the appearance of the osteoblast forming bone and substituting the cartilage. Therefore it seems as though both processes can take place at the same time. 3. The regeneration of bone also takes place from the marrow and cortical bone, but in a more limited degree and at a later period than that from the periosteum. 4. The regeneration of cartilage takes place almost entirely from the perichondrium. It proceeds by a direct proliferation of all the layers of the perichondrium beneath the outer fibrous tissue. There is some evidence in favor of the view that the connective tissue is also transformed into cartilage under the stimulation of the neighboring cartilage of perichondrium. 5. There is a slight amount of regeneration of cartilage from the original cartilage near the perichondrium, but the remainder of the cut end tends to undergo degenerative changes. 6. The extent of the removed cartilage exerts no influence on the regeneration. (There is no evidence of calcareous changes in the regenerated cartilage, even as late as 46 days.)

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Original Articles

RECTAL NEURALGIA OR HYSTERIA.

By P. LOCKHART-MUMMERY, F.R.C.S.

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It is necessary to be very careful in calling a case "hysteria" or "rectal neuralgia," for too often this is done because the surgeon has been unable to discover the cause of the symptoms, a cause which is nevertheless present. In the great majority of cases there is a local lesion to account for the symptoms, but it is often very slight, and may easily be overlooked unless the examination is conducted with great care and thoroughness. In any case, the symptoms complained of by the patient are often apparently out of all proportion to the severity of the lesion.

Frequently the patients come under the term "neurotic;" they are nervous, excitable, very much afraid of being hurt, and seem to attach quite an undue amount of importance to their symptoms. The symptoms complained of are usually vague and somewhat indefinite in character. The patient often describes a number of extraneous symptoms which a healthy man would not think of, or at any rate consider abnormal, and which are simply evidence of a morbid state of mind. Such a patient may frequently be known by the fact that he brings a long written statement with him, describing his symptoms in detail. It is, however, a grave mistake for the surgeon to label these persons at once as neurotic, and to make only a cursory examination during which he expects to find nothing. On the contrary, a most careful and painstaking examination is advisable, and will often result in the discovery of some little suspected lesion, which, if properly treated, may make a new man of the patient. Such patients, from long brooding upon their condition, have often become a nuisance to themselves and their friends, and it is worth any effort to restore them to a healthy state of mind.

Some of the worst cases of rectal neuralgia occur in medical men. The patient, when he is a medical man, invariably believes that he is suffering from cancer of the bowel, or that cancer will supervene upon his present condition. His medical knowledge aids him in inventing symptoms and prognosing horrors. He is often run down and overworked, and what is required is a complete change of scene and occupation rather than any local treatment.

Symptoms. The symptoms vary considerably in different cases. Sometimes the patient can give no definite symptoms, and is only continually conscious that he has a rectum; it is hardly ever absent from his thoughts, and though no definite pain is experienced, he is always uncomfortable. Some of these patients suffer much at times from pruritus. In other cases, the complaint is of a sharp, stabbing pain in the anus often called "intolerable." This pain has no relation to the action of the bowels, and comes on without apparent cause. Other patients complain of a sense of fulness and discomfort, accentuated on sitting down.

In all such cases a very careful examination should be made of the rectum and colon. These patients are often hypersensitive, and the examination is difficult to carry out properly, so that it is frequently advisable to administer an anesthetic. Sometimes after a most thorough examination, or repeated examinations, no cause can be found, and in spite of the symptoms the bowel appears to be quite healthy. In a considerable number of cases, however, a local lesion or some other cause can be found.

Causes. One or other of the following causes

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is often present, and they should always be looked for:

Proctitis or Sigmoiditis. A mild chronic proctitis or sigmoiditis is frequently the cause of these symptoms, and this will be revealed on examination with the sigmoidoscope.

Internal Fistulæ. A not uncommon cause of these neuralgic pains in the rectum is the presence of a small, internal fistula. These fistulæ are often quite minute, and open at the bottom of one of the anal valves; they can be easily passed over unless particularly looked for with a special bent probe. They may be discovered by the patient's complaining of acute pain when the hooked probe is passed to the bottom of one of these little anal valves.

Ulcers. In the same way small ulcers covered by the anal valves, or situated at some distance up the rectum, may be the cause of rectal pains. These ulcers are sometimes very small and lie in unsuspected places—between folds of mucous membrane—so that they are not easily detected. A touch with the electric cautery is often sufficient to cure the condition.

Congestion of the Rectal Vessels. This condition was described by Allingham, who attributed the aching and pain to pressure upon the rectal nerves from the congested vessels, and compared it to the aching felt in varix of the leg or in varicocele.

Reflex Causes. When the rectum is quite healthy, the cause may sometimes be found in disease of the contiguous organs. In women uterine troubles or disease of the appendages is a not uncommon cause of rectal pain. Bladder or urethral conditions may also be the cause; or, in the male, prostatic trouble. I have seen one or two cases in which the pain of lumbago or sciatica was referred to the rectum, and only after a careful examination was the true cause found.

Spinal Disease. This is a most important point to investigate. Caries of the spine, locomotor ataxy, and disseminated sclerosis are all possible causes of rectal pain, and in some cases the rectal symptoms may be the earliest complained of. An examination of the spine and reflexes will assist the diagnosis.

Epilepsy. Allingham pointed out that the aura of epilepsy may occur in the rectum, and that some of the puzzling attacks of pain in the rectum may have this cause; this may be suspected in particular if the attacks of pain occur at night. A careful investigation of the family history will be of value.

Tabes Dorsalis. The subject of rectal crises due to locomotor ataxy is conveniently treated of here. It is chiefly of interest on account of the liability to form an incorrect diagnosis, when one meets with a case probably sent up to the hospital without any hint as to the presence of locomotor ataxy, and with only a history of rectal pain. These cases are very rare, and I have only seen five. My experience has been that the rectal crises occur as an early symptom, but that definite signs of tabes can be elicited, such as exaggerated knee-jerks, Argyll-Robertson pupils, difficulty in standing with the eyes shut and the feet together, and, in one case, loss of sensation over certain nerve areas.

Treatment. It is often very difficult to cure the patient entirely if the condition has lasted a long time, as the morbid state of the mind is liable to persist after the pain has ceased. When proctitis is present, local treatment of the bowel with glycerine, thymol comp., followed by astringents, is often most beneficial. Von Noorden's diet is also good, as, in addition to its beneficial effect upon the bowel, it aids in feeding up the patient and improving the general health.

A point of particular importance in these cases, and one which is too often overlooked, is that the patient is generally in a poorly nourished, and even anemic, condition, and to feed up and fatten him is often of as much importance as the local treatment. The proctitis may also be treated by olive-oil injections per rectum, as recommended for ulcerative colitis. A certain, often considerable, amount of oil is absorbed by the bowel, and it is quite common to find that patients who have been for a week or two on oil injections put on a considerable amount of fat. I have, however, found petroleum by the mouth most useful to insure easy and regular action of the bowels in these cases.

In some cases a treatment of zinc ionisation of the rectum will give marked relief, and this is well worth a trial if other local means fail.

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Careful investigation of the cause of the pain, and treatment of this upon rational lines, is the correct procedure; but it is also necessary to prescribe for the patient quite apart from this disease. Thus a change of occupation, a prolonged holiday, or residence at the seaside are often important contributory factors in the successful treatment of these difficult cases.

DIAGNOSIS IN SOME COMMON RECTAL DISEASES.

By JEROME M. LYNCH, M.D., F.A.C.S., New York.
Professor, Rectal and Intestinal Surgery, New York Polyclinic.

Where a lesion is confined to the caudad extremity of the hindgut, an accurate diagnosis should be a matter of course. With the extensive methods of examination now at hand, guess work is unpardonable. If slipshod methods are allowed, there will be many grave errors—errors which sacrifice the life, health or comfort of the patient. Perhaps the most horrible result of a snap diagnosis is to content one's self with treating a patient for hemorrhoids because he passes blood, when a little further investigation would have located a cancer.

This has occurred in twenty-five per cent. of the cancer cases that have come under our observation, and is without excuse, as a simple, digital examination would reveal the presence of a growth in most of these cases.

Considering a few of the common lesions in which a diagnosis is comparatively simple, and in which proper treatment, instituted in reasonable time, is followed by gratifying results, we will mention:

1. *Cancer.* It must be admitted that many cases of cancer exist for a long time without symptoms other than blood and mucus. The popular conception that pain, loss of weight and great anemia are classical symptoms of cancer is entirely erroneous as far as operable carcinoma is concerned. These symptoms do occur in very advanced cases and are terminal symptoms, and, as Mr. Moynihan expresses it in speaking of ulcer of the duodenum, when hemorrhage occurred, the vast majority of cases were beyond the pale of surgery. The same is relatively true as regards pain and loss of weight in cancer. Probably the earliest symptom of cancer of the rectum is constipation. We have confirmed these observations repeatedly, especially in the case of minute recurrences which could not possibly, in themselves, offer any excuse for mechanical obstruction, the bowels having been regular since the primary resection and up to a short period before the recurrence. This inhibition is perhaps associated with Nature's effort to cause a recession of the growth. It is common practise to associate diarrhea with a new growth; but, of course, diarrhea is no evidence of the absence of constipation, for paradoxical as it may seem, the most persistent diarrheas are those associated with constipation. The frequent and imperative desire to defecate is not properly a diarrhea but a mere subjective reflex without objective basis. So often, a diarrhea of this kind is mistaken, clinically, and so closely may it appear to be allied to the inflammatory conditions of the colon that one cannot consider them true inflammations without mentioning malignancy. We think it would be well to confirm or disprove our findings, and then if confirmed let it be generally recognized that often the earliest clinical sign of cancer is a relatively sudden constipation.

The next most frequent symptom is the presence of blood with or without mucus, in fact, in some cases the only symptom of cancer has been the presence of a little blood at stool. This possibly has

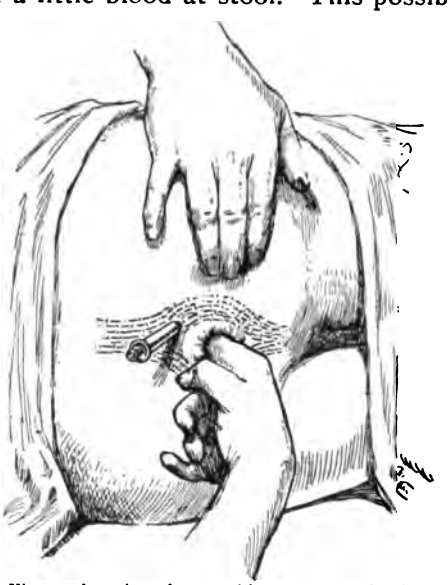


Fig. 1. Finger dragging down sphincters. Needle introduced in proper line. External sphincter shown in dotted lines.

led to the mistaken diagnosis of hemorrhoids and the treatment based upon the *patient's* diagnosis without further examination. In the majority of cases when cancer is present there is a desire to move the bowels often. Sometimes this desire is

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imperative, especially in the morning, with the passage of a little blood, mucus, and large quantities of gas. The patient has a feeling as if there were something more to come away. In some cases where there is no obstruction, he has the feeling that there is one. After the tumor has existed for some time, there is a desire to move the bowels the first thing on arising in the morning; then the desire becomes frequent during the day; and, in the later stages of the disease, several times during the night.

The diagnosis is always confirmed by a digital examination, in the majority of cases. The presence of a crater-like indurated tumor is characteristic of cancer. Primary malignant tumor of the rectum should never be mistaken for anything else, but there are exceptions. This is so when the tumor is secondary to a growth in some other part of the intestinal tract. The inexperienced may mistake cancer for tuberculous ulcer or a stricture, but primary tuberculosis of the bowel is extremely rare and, in the large majority of cases, is secondary to a focus in some other part of the body. A stricture is smooth and has not the nodular feeling of a cancer. It is sometimes difficult to differentiate between a perirectal stricture and a sarcoma, and in some cases it may be necessary to take a specimen in order to establish the diagnosis, but under no other circumstances should we suggest removing a specimen for diagnosis. We know of no more pernicious habit than that employed by some surgeons of removing a piece of a tumor in order to establish a diagnosis. It is unnecessary in 98 per cent. of cases.

The treatment of cancer is always surgical, except where there is involvement of the liver, peritoneum, or extensive involvement of neighboring organs. The results following operation compare very favorably with those for cancer in any other part of the body, even where the tumor has existed for a long time. Of sixteen recent consecutive cases, taking them as they came, good, bad, and indifferent, we have lost three. The writer helped the late James P. Tuttle with one hundred and eighty cases, and our average mortality was fifteen per cent., 60 per cent. of the balance recurred within three years, 40 per cent. remained cured after three years.

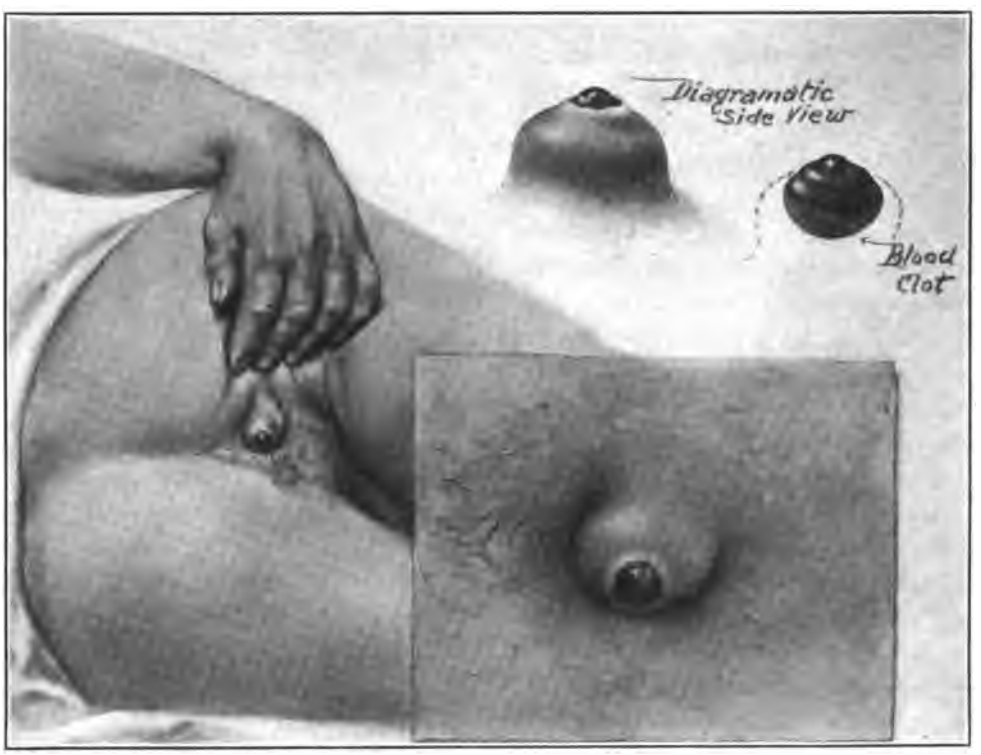


Fig. 2. Thrombotic hemorrhoid. (Reproduction from a photograph.)

2. Stricture. Stricture is always the result of an infection. The cause of the infection and the infecting agent are uncertain. We frequently see the most severe infection, lasting for a considerable time, disappearing without seriously damaging

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the bowel wall. On the other hand, very mild grades of infection are followed by the most pronounced contraction.

As the majority of strictures are found within the first two and a half inches of the bowel, the diagnosis should be easily made. The symptoms associated with strictures are usually gradually increasing constipation, passage of blood and mucus, frequent desire to empty the bowels, with a feeling of unfinished stool; and the diagnosis is confirmed by digital examination. It differs from cancer in that the surface is smooth though contracted. A great deal can be accomplished if the stricture is seen within a reasonable time, and, of course, the prognosis must be influenced to a great extent by the character of the stricture. A long tubular stricture is much more difficult to treat and the results are not as good as where the stricture is circumscribed. If the contraction is annular or limited, gradual dilation is sufficient in most cases to effect a cure. How can this dilation be accomplished? In the majority of cases the gloved finger is the safest method. Where the stricture is tubular we have always resorted to a colostomy, as by this method the ulceration and inflammation rapidly subside and heal, and dilation can be more easily accomplished both from above and below.

Irrigation, with a solution of permanganate of potash, 1 to 10,000, peroxide of hydrogen 2 per cent., gives the best results in the treatment of tubular stricture. No attempt should be made to dilate the bowel until the inflammation has subsided; but, after this, gradual dilatation with bougies, or in some cases a posterior proctotomy followed by bougies, gives the most satisfactory results.

3. *Hemorrhoids.* Hemorrhoids can be seen, but very rarely felt. Therefore, in order to make a diagnosis it is necessary to see the hemorrhoids and this can be best accomplished by passing an anoscope. But even though the presence of hemorrhoids is established, it must not deter the surgeon from making a more thorough exploration of the rectum and sigmoid in order to eliminate more serious lesions. As the veins running from the anus to the liver do not possess valves, any obstruction may result in hemorrhoids. The most common obstructions are intussusception of the rectum or sigmoid, cirrhosis of the liver, cardiac insufficiency, tabes dorsalis. It is important to exclude these complications, as the bleeding is beneficial in cardiac insufficiency and cirrhosis. In tabes the general relaxed condition of the musculature is the cause of the hemorrhoids and no good purpose can be served by their removal. Of course an external thrombotic hemorrhoid, if diagnosed early and incised, will be almost immediately relieved. It is surprising how often a thrombotic hemorrhoid is mistaken for an internal hemorrhoid. Frequently when called in consultation I have been told by the surgeon in charge that he has tried every known method but failed to relieve the patient. By



Fig. 3. Prolapsed and inflamed internal hemorrhoid with inflamed external hemorrhoid.

injecting a little novocain and slitting open the hemorrhoid, turning out the blood clot, and applying pressure for twenty-four hours, the patient received immediate relief and at the end of that time was perfectly well.

Venous external hemorrhoids are usually associated with a very tight external sphincter muscle and can be most satisfactorily treated by the application of an astringent ointment.

Skin tabs are the result of thrombotic hemorrhoids, inflammation, syphilis or gonorrhea. They cause distress on account of the difficulty in keeping the parts clean and the constant irritation and erosion. Such hemorrhoids may be perforated by little fistulous openings, the result of previous subcutaneous

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or cutaneous abscesses. When well developed, they should be removed under novocain.

In the great majority of cases, hemorrhoids can be easily removed under novocain anesthesia. One case recently operated on at the Polyclinic Hospital had hemorrhoids associated with prolapse. They were removed under local anesthesia. Eleven days after the operation the patient was exhibited before the class, and it was difficult to tell that he had been operated on so short a time previously.

Cryptitis and Papillitis. In the anus there is a number of little pockets supported on either side by pillars; from the pillars develop sensory bodies; these bodies are known as papillæ. The diagnosis is made by the symptoms and by direct investigation of the crypts, by means of a probe bent to resemble a shepherd's crook. The treatment consists in re-

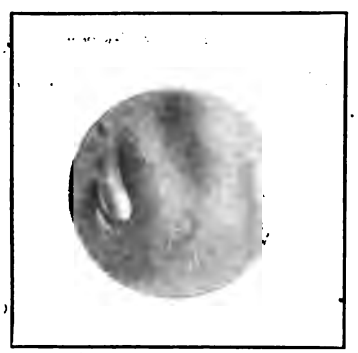


Fig. 4. Polypus seen through proctoscope.

moving the crypt and stretching the anus. Inflammation of the papillæ is occasionally associated with inflammation of the crypts. The papillæ are frequently associated with hemorrhoids and may obtain enormous proportions in some individuals. They may cause pruritis or itching and give the patient the impression of passing worms. When discovered, they should be snipped off under novocain.

Prolapse of the Rectum. Prolapse of the rectum is usually spoken of as complete or incomplete. One should be able to distinguish between the two almost immediately by the fact that the sulci run all around the bowel in a complete prolapse, and longitudinally in an incomplete. The incomplete prolapse is usually found in children and in old people. Occasionally it follows the continuous use of saline cathartics. By asking the patient to strain, or by giving an enema, the prolapse can be brought into view. A proctoscopic examination should never be neglected, as a simple polypus may be the cause of the prolapse and when this is removed the prolapse gradually improves. Sometimes indeed this is all that is necessary to effect a cure. Tabes dorsalis is almost invariably complicated by prolapse. It is important, therefore, that this cause should not be overlooked, as radical measures under such circumstances are out of the question, and even if they



Fig. 5. Prolapse in a child.

were undertaken would only be of temporary relief. In treating this trouble in young children, it should be seen to that the child has an easy movement without straining, and in some cases it may be necessary to administer a cathartic or enema. Whenever possible, the child should move his



Fig. 6. Pruritus ani,

bowels flat on his back, which can be accomplished by the use of a bed pan.

Fissure. A patient may have hemorrhoids for years and even though they prolapse and cause great inconvenience, he will look on it lightly, but the moment they become painful, he immediately seeks treatment. In almost every instance this is

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due to an abrasion of the mucous membrane, commonly known as fissure in ano. A fissure is the most painful of all lesions of the proctodome. It is usually found in the anterior commissure in women and in the posterior commissure in men. This is



Fig. 7. Fistula, Mr. W., before operation.

easily explained by the fact that the line of least resistance in woman is in front, and, in man, in back. The diagnosis can only be made by inspection. The history is usually as follows: After a movement

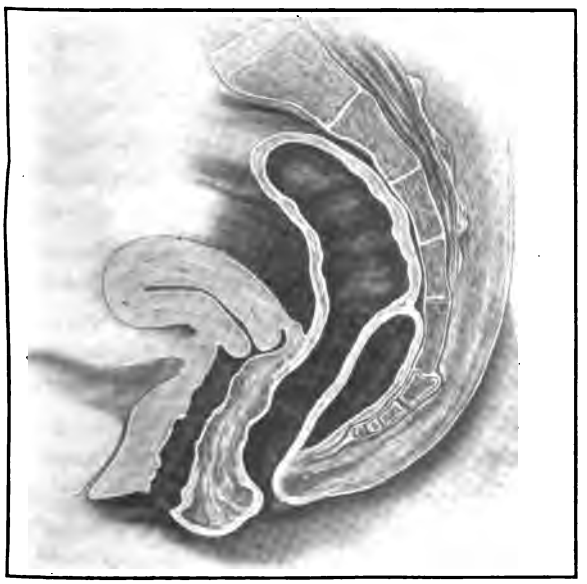


Fig. 8. Post-rectal abscess, which may result in a fistula.

the patient complains of a burning sensation and occasionally notices a drop or two of blood. The pain may be referred to the ovaries in women and to the prostate in men. On account of the intimate nerve association between the genital organs and the proctodome, a lesion in one is very often reflected in the other. This accounts for the fact that occasionally the patients are treated for a prostatic condition, when in reality the trouble is due to a fissure. Sciatica or pain in the hip is a common accompani-



Fig. 9. Fistula, Mr. W. This patient had had twelve operations before he was referred to the writer, and this is the result after excision and suture.

ment of fissure, and the pain along the sciatic nerve may be so pronounced as to overshadow the real cause. The treatment, of course, may be either med-



Fig. 10. Post-anal dimple.

ical or surgical, depending upon the duration and extent of the lesion. Gradual dilatation under novocain and the application of ichthyol, nitrate of silver, or tincture of iodin will effect a cure in a great many cases; others require cutting or stretching of the muscle.

Pruritis Ani. Pruritis ani may be due to an infection of the skin or to some local condition such as external hemorrhoids; or an inflammation of the

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bowel, or other causes too numerous to mention. The diagnosis is easily made and is nearly always made by the patient. Autogenous vaccines afford relief in a certain percentage of cases, whereas in others local applications or some minor surgical operation is necessary. Of the local applications, none is more effective than painting the parts with tincture of iodin twice a week. The surgical measure consists in the removal of the external hemorrhoids or inflamed papillæ. Proper treatment for

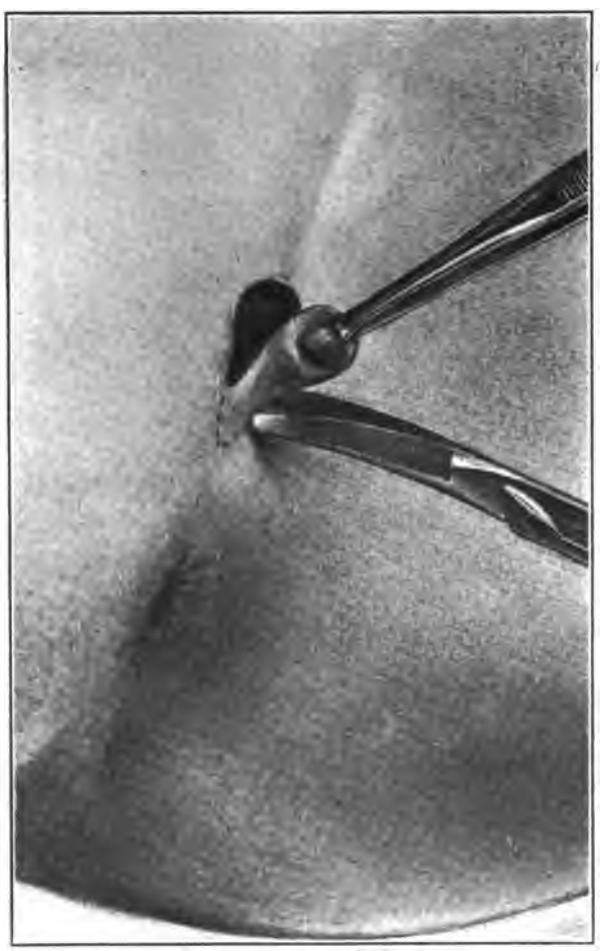


Fig. 11. Post-anal dimple; method of removal.

fissure and chronic cases, is the operation devised by the writer. (Lynch, Diseases of the Rectum, p. 213.)

Fistula. The diagnosis of fistula is made by inspection, palpation, and finding the internal or external opening. The external opening may be hidden in a fold of skin, but by palpating with the index finger one should always be able to outline a fistula. The writer's method for following a fistulous tract and finding the internal openings is as follows: "A solution of 30 per cent. methylene blue and 70 per cent. peroxide of hydrogen is injected into the fistulous tract by means of a specially devised syringe, or if that is not at hand, an ordinary hypodermic syringe is used, the needle having been previously broken off close to the cap. This method is also useful in locating the internal opening, because no matter how small such an opening may be the peroxide and methylene blue will eventually appear in little bubbles, revealing almost instantly whether the fistula is complete or not." *

The treatment is always surgical. In a great many cases novocain anesthesia is sufficient.

Post-anal Dimple. Of all the lesions that occur around or in the rectum, the one that is most often overlooked or mistaken for something else is post-anal dimple (see Fig. 10). It is due to an inflammation of the skin, is seen most frequently in hairy people, and failure to cure is due to the fact that the canal is lined with skin and a simple incision is not sufficient; excision is the only method (Fig. 11 illustrates the method of removing it).

108 East 65th St.

* Lynch, "Diseases of the Rectum and Colon," p. 172.

The Question of Cure in Gonorrhea.—Dr. Abr. L. Wolbarst (*N. Y. Med. Jour.*, Jan. 23, 1915), in an article entitled "How Shall We Know when Gonorrhea in the Male is Cured?" concludes that no patient can be declared cured of gonorrhea unless the following tests have been carefully and repeatedly performed: 1. Microscopic and cultural examination of the centrifugated morning urine, as well as the washings from the irrigation of the anterior urethra. 2. Microscopic and cultural examination of the urethral discharge—whether spontaneous or artificial. 3. Microscopic and cultural examination of the massaged secretion of the prostate and seminal vesicles. 4. Urethroscopic examination of the anterior and posterior urethra. 5. Complement fixation test. 6. Skin reaction and hypodermic injection with gonococcus vaccine (still *sub judice*). Should all of these tests prove negative repeatedly, we may then feel that as far as present knowledge permits, the patient may be declared cured; but the physician cannot assume the full responsibility and guarantee the cure. The patient himself must assume that responsibility.

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THE ANGIOTRIBE IN HEMORRHOIDS.

By ROBERT T. MORRIS, M.D., New York,

Professor of Surgery, New York Post-Graduate Medical School.

Some years ago when the Tuffier angiotribe was introduced for the purpose of crushing bloodvessels in general surgical work, it seemed to me that this instrument possessed special advantages for crushing hemorrhoids.

The instrument is said by its inventor to exert a pressure of three thousand pounds, and one of the New York surgical instrument manufacturers who is interested in the mathematics of force, tells me that this estimate is probably correct.

When a hemorrhoidal mass is drawn between the jaws of the angiotribe it must be held firmly between them with a pair of forceps, otherwise closure of the angiotribe jaws will force out a little margin of the hemorrhoidal mass.

The jaws of the angiotribe are inserted in line with the long axis of the rectum. When the hemorrhoidal mass is crushed at its base, any parts protruding beyond the jaws of the instrument are snipped off with a pair of scissors.

When the angiotribe is opened and the crushed tissue released, it is observed to consist of a thin sheet of "parchment" about one-third of an inch wide. This is not to be trimmed off. It is allowed to separate spontaneously.

The advantages of this method seem to me to be very definite.

(1) Bloodvessels and lymphatics are absolutely crushed so that there is no hemorrhage to need attention.

(2) The bloodvessels are so thoroughly crushed that danger of embolism is averted.

(3) Nerves are so thoroughly crushed that comparatively little pain follows the operation.

(4) Other tissues are so thoroughly crushed that their residue does not invite any dangerous degree of infection.

A little aristol is dusted over the area, and a firm T-bandage applied. The bowels may be kept locked up for two or three days, or allowed to move daily if soft movements may be assured.

When the crushed ridge of tissue comes away there is sometimes a moderate degree of gaping of margins, but by this time reparative processes are under way so that nothing more is required but an occasional dusting with aristol.

I do not remember to have seen a case of spasm of the bladder muscles or spasm of anal sphincters following this angiotribe operation.

In cases in which we have to draw in a little of the skin when including the hemorrhoidal mass, this particular part sometimes gapes more widely than the part which lies within the mucous field, but it requires no treatment beyond dusting with aristol.

The method is applicable for practically all of the ordinary cases of internal and external hemorrhoids, and I have even employed it in two or three cases in which prolapse of the bowel was a complicating feature to a moderate degree. In these cases two or three bites in line are taken with the angiotribe. One simply needs to make sure that no peritoneum is included within the bite in a prolapse case.

CONSTIPATION AND OBSTIPATION.*

By SAMUEL GOODWIN GANT, M.D., LL.D., New York.

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First, constipation should be divided into the *congenital* and *acquired* types. Many infants and children suffer from constipation practically from birth. In such cases, costiveness is frequently due to some mechanical defect, easily corrected; but when it is not corrected, the disturbance increases as the child begins to consume more and heavier food.

Acquired constipation may be induced in many ways, and can be subdivided into five types: (a) *Fragmentary,* where the patient has several daily evacuations, and the feces are chopped off in small pieces, yet the bowel is not completely emptied. (b) *Psychic,* where the patient has a definite idea of what he thinks the color, form, and amount of the daily movement should be, and when it does not meet his expectations thinks he is constipated. (c) *Spastic* (enterospasm), where the bowel is blocked by the simultaneous contraction of the circular and longitudinal muscle fibers, incident to a reflex disturbance or irritation. (d) *Atonic,* resulting from gormandizing, failure to empty the bowel at regular intervals, dissipation, etc. (e)

* Read before the Clinical Society of the Post-Graduate Hospital on February 19, 1915.

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Mechanical, obstructive, or *surgical* constipation, where the evacuations are partially or completely arrested by bowel defects which contract or narrow its lumen, viz., pericolic membranes, adhesions, Lane's kink, ptosis, invagination, hypertrophy of the anal sphincter, levator ani muscle or rectal valves, narrow anal canal, rectal deformities, etc., which require surgical procedures for their relief and cure.

Sufficient stress has not been laid upon the importance of diagnosing the different types of constipation and localizing the intestinal section or part which is responsible for the constipation. When the trouble is *abdominal,* repeated rectal examinations with the finger and proctoscope demonstrate that the feces are not in the lower bowel; and this can be verified by administering one or two-quart enemata. When, however, a tumbler of water invariably secures an evacuation, it shows that the defect is in the *rectum.* Again, when the trouble is in the *sigmoid,* the fecal mass can be felt in the rectal vesicle or Douglas's pouch.

Fluoroscopic examinations, radiographs, and stereo-radiographs are valuable confirmative diagnostic aids, but the diagnosis should not be based upon them until a thorough history has been taken and the patient has been carefully examined in other respects. I am firmly convinced that to-day thousands of patients are being operated upon simply because an incorrectly interpreted x-ray plate indicates that there is some kind of block at a definite point in the bowel. Anatomical drawings are usually made with the patient lying on the back, and when an x-ray picture is taken with the patient in another posture the abdominal viscera frequently change their position and do not agree with Gray's "Anatomy," hence an *entero-anastomosis* or *colectomy* is supposedly indicated—operations which are very seldom required and which in many instances eventually leave the patient in a worse condition than before their performance.

My large experience with this class of cases conclusively demonstrates that minor defects in the rectum induce constipation very much more frequently than abnormalities within the abdomen or pelvis, and I think it is time we should quit laparotomizing patients so frequently for the cure of constipation and resort instead to minor procedures by which we can quickly and easily relieve it.

Proctologists, in doing many rectal operations, divulse or incise the sphincter muscle, and are continually surprised to have the patient remark that his constipation has been cured as well. This would indicate that the trouble is usually located in the lower and not in the upper bowel. Following entero-anastomosis, unilateral or bilateral intestinal exclusion, the opening frequently narrows or closes, particularly when an end to end or end to side anastomosis is made; hence the procedure should be resorted to in extreme cases only, and then lateral anastomosis with a three-inch opening is indicated.

When the constipation is rectal, usually it can be corrected under local anesthesia by divulsing or dividing the sphincter, splitting the anal canal, cutting through obstructing fibers of the levator ani muscle, or severing the rectal valves with one of my valve clamps. When the trouble is due to angulation, ptosis, or invagination of the sigmoid flexure into the rectum, obstipation can be quickly relieved in the majority of instances by straightening the bowel out and anchoring it to the anterior or posterior abdominal parietes by a few suspension stitches (sigmoidopexy). Where the trouble is due to adhesions or pericolic membranes, these should be removed or destroyed while in plain view, and the subsequent formation of adhesions prevented by covering all peritoneal areas, placing sterile oil in the abdomen, changing the patient's posture, and administering some medicine which will incite mild peristalsis, and keep raw surfaces from remaining in contact until a few hours subsequent to the operation.

I find that the chief trouble with physicians and general surgeons regarding the handling of constipated patients is that they are usually *dead set upon having all their patients suffer from a particular type of constipation,* when frequently there are manifold causes of the delayed or imperfect evacuations in an individual case, all of which must be corrected if a cure is to be obtained.

As a rule, apparently, doctors believe that the *form* in which feces are expelled is given to them by the shape of the intestine. This is not true, because prior to defecation the fecal mass collects in the shape of a putty-like mass in the rectal ampulla and remains there until it is driven out by the contraction of the rectal musculature, invaginated piston-like action of the sigmoid flexure, and contraction of the abdominal muscles; and the form in

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which they are expelled is produced by contraction of the levator ani or sphincter muscle, or narrow anal canal. Consequently, slight abnormalities of these anatomical parts greatly modify the appearance of the stool; and the diagnosis of stricture or cancer is often made because the feces are evacuated in pencil or tapelike pieces, when the patient may have a fissure or an irritable rectum that causes spasm of the levator ani or sphincter muscle which in turn compress the feces and are responsible for these peculiarities.

The pernicious practice of indiscriminately *divulsing* the *sphincter* muscle for constipation should be stopped, because it is not indicated very often, and should be practiced only when the sphincter is hypertrophied or the anal canal is narrow. When the muscle is lax and the finger can be easily inserted into the bowel, divulsion or incision of the sphincter is contra-indicated and may cause incontinence.

471 Park Ave.

COMPLEX RECTAL SYMPTOMS.

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The diagnosis of rectal disease from diseases located in the surrounding organs often necessitates the elimination at first of the probable original point of trouble. A differential diagnosis based on symptoms which originate solely from disease in either the male or female organs adjacent to the rectum and sigmoid flexure is sometimes necessary. The symptoms of pain or tenderness which are made worse by walking, deep pressure on abdominal examination, or palpation through the vagina, invariably suggest to the gynecologist the possibility of ovarian disease, which may exist associated with any affection of the sigmoid, such as impaction of feces, hypertrophic catarrh, or an angulation. Affections of the sigmoid flexure, such as perisigmoiditis, diverticulitis and sigmoiditis, are often overlooked due to the assumption that all pain over the left inguinal or iliac region is only associated with tubal or ovarian disease.

These symptoms are presented together commonly as verified by sigmoidal examinations and are often due to affections primarily of the uterine appendages. The sigmoidal disease must be treated with the original cause to insure relief. A laparotomy may be necessary in some cases to diagnosticate a diverticulitis or a sigmoiditis.

Affections of the sigmoid are characterized by pain in the left inguinal region of the abdomen. Pain in this region is quite as significant of sigmoidal disease as pain occurring in the right inguinal region is of appendicitis, only the sigmoid is not as frequently involved. Affections of the sigmoid may be mistaken for ovarian disease or a left-sided appendicitis. The indurated sigmoid, "iliac roll," or "sausage-shaped roll" is indicative of the chronic affections. Perisigmoiditis is an acute suppurative affection characterized by symptoms resembling appendicitis and demands immediate operation.

The influence of disorders of the intestinal tract upon the body in general is attracting rigorous study, particularly those of the nervous system. Auto-intoxication resulting from the absorption of putrid material or bacteria by the weakened intestinal mucous membrane is regarded as a common cause of mental and nervous disorders.

The complexity of the anatomical relation of the rectum to the other organs of the pelvis is strongly brought to our attention when we consider their common origin from the mesoblast. The genito-urinary organs and the rectum are closely grouped together in the pelvic cavity. The nerves, the blood-vessels and the lymphatics are so intimately associated in their physiological action that it seems only reasonable to expect that disease in one would be very likely to disturb the other, sympathetically or functionally. The female productive organs are particularly prone to reflex disturbances due to pain in the rectum. It has been the experience of the writer to find that in old men atrophy or hypertrophy of the prostate is commonly associated with a rectal disease over the prostate analogous in its pathology, showing that, in some way, the blood-vessels or nerves supplying the contiguous tissue become involved and produce similar disturbance in the rectum.

If one may use the term, there also seems to be a nervous impression, since a traumatism to one or inflammation of the other is very likely to have an effect upon both. This might be explained on the ground of the close anatomical relationship in the spinal cord of the nerve centers governing these organs which allows a short circuit of efferent or

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afferent impulses. The phenomena illustrating this are often emphasized by the retention of urine after hemorrhoidal operations; and from the genital tract in the presence of dysmenorrhea and prolapse of the ovaries, producing a congestion of the mucous membrane of the rectum in the form of hemorrhoids. In the presence of a parametrial inflammation the subject often suffers from either a proctitis, spasmodic anal sphincters or a cystitis, or from all three combined.

An ulceration of the rectum may cause irregularities of the menstrual flow, or amenorrhea in cases of periodic bleeding from the rectum. Irritation of the rectum may have a reflex action upon the pelvic organs in such cases owing to the close relationship from proximity of other nerve centers.

Sometimes the secondary disturbance to disease of the genito-urinary organs produces even a greater reflex agitation than the primary trouble, as a dysuria, dysmenorrhea or vaginismus due to a rectal ulcer, fissure, proctitis, or constipation with autointoxication. Viewing the subject of reflex neuralgic pains due to ovarian or cervical disease from the standpoint of the gynecologist, we have many truthful instances of relief from suffering in distant parts of the body by removal of the diseased ovary or repair of the cervix. Almost invariably an ulcer of the rectum, stricture, fissure or inflammation of the crypts of Morgagni, when of long duration, will inflict sufficient irritability on the nervous system to cause either a local neuralgia or other symptoms of nerve impairment. These cases sometimes give a well-marked symptomatology of ovarian or uterine pain, and after douches and tamponing in the treatment given by the gynecologist, they are relieved of these symptoms by the cure of some rectal disease. These mistakes arise from the description of the pain as given by the patient being accepted as sufficient for a correct diagnosis. An ulcer of the rectum, fissure in ano, anal stricture or a cryptitis will often not only cause widespread reflexes, but also local reflex spasm of the levatores ani and sphincter vaginæ muscles which while in a state of spasm constrict the parts.

Both the mucous membrane of the anal canal and the muscular apparatus are often kept in a condition of pain by the irritation of a cystitis, vulvovaginitis, or displacements and adhesions of the uterus or ovaries. Perirectal stricture from old inflammations around the uterus often causes pain which is referred to the rectum, when the primary and pathological origin lies in the parametrium. Reflex pain, which is described by the patient as shooting down the leg, is common to diseases which are located in the rectum, anal ring or pelvic organs, and must not be accepted as being worthy of much diagnostic significance in the differentiation of these diseases. The pressure from a tumor of the uterus or its appendages is quite as likely to cause pain of this character as the constant irritation from a rectal ulcer.

Pains which are referred to the floor of the rectum and the sacroiliac region are so intimately associated with disease of the rectum, anus or female pelvic organs that very often our only means of arriving at a correct diagnosis is by elimination or exploratory laparotomy. Pains in the back and within the pelvic cavity were heretofore all supposed to be due to a laceration of the cervix, weakened levatores ani or a prolapse of the uterus. In later years the ovaries and tubes, or adhesions of the different generative organs, were the objective points for operation and were removed in order to relieve these symptoms. In many instances relief is attained by such treatment, but, nevertheless, it should not be taken as a fact that all sacroiliac and pelvic pain is due to disease of these organs, and for the benefit of humanity a broader scope of learning will emphasize the usefulness of proctology.

Rheumatism or strain of the iliosacral synchondrosis may be the cause of these pains and necessitate treatment from that point of view. A rectification of the diseases of the pelvic organs, the removal of hemorrhoids or the cure of rectal ulcer will not cure the pain in patients suffering from disease of this joint. A combination of these conditions is sometimes met with, particularly after childbirth, when there exists a rupture of the perineum, rectocele, hemorrhoids, a fissure in ano, a partial prolapse of the uterus, or a traumatism to the iliosacral joints which has terminated in rheumatism. The cure of any one of these conditions is not likely to relieve the pain and suffering due to the others, so that to attain success the gynecologist must broadly consider the cause and effect of pathological conditions within the pelvic cavity. The question, then, becomes one of complete differ-

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ential diagnosis and the exact determination of the causes; then the institution of effective and radical treatment of each and all of the diseased conditions in either organ.

The function of the rectum is that of a receptacle for the fecal mass prior to expulsion, the expulsion of its contents at regular periods, and the absorption of the fluids contained in the feces. These physiological functions may easily be interfered with to a variable degree by diseases of the female organs of the pelvis or, mechanically, by pressure from them. Irritation or inflammation, pressure from a retroverted uterus, or adhesions which cause deformities in the form of angulations or stricture, will either interfere with peristalsis of the lower bowel, with the normal supply of blood, or the nerves which maintain its equilibrium.

The functions of the female genital organs are parturition, procreation, menstruation and micturition, and are often altered very much by affections of the rectum, as follows:

Parturition may be interfered with temporarily by a foreign body or fecal impaction of the lower rectum, hypertrophy of the levator ani muscles, which prevents a full relaxation of the perineum, and a complete impediment by the presence of a large fibroid or other tumor of the rectum. The rectum is also used for the absorption of nutrient enemata. Its wonderful osmotic power is well illustrated in the Murphy irrigation, which consists of a physiological saline solution intended to aid the system in the neutralization of bacterial poisons. The Fowler position and these irrigations have given us ample reason to regard the lower intestinal canal as offering a most valuable adjunct in the treatment of surgical cases complicated by pus in the lower abdomen.

Procreation may be interfered with by fecal impaction which causes an acute flexure of the uterus.

Menstruation may be delayed by constipation or brought on by a diarrhea, and caused to act vicariously by any discharge, hemorrhage or profound shock to the nervous apparatus of the rectum in the form of a surgical operation.

Micturition is affected by acute inflammations, fissures, painful rectal ulcerations, traumatisms, either surgical or direct violence, and by large growths of the rectum.

Growths of the female pelvic organs do not, as a rule, encroach upon the rectum unless the cavity is snugly filled up or the growth is wedged in the pelvic cavity so that it does not rise above the pelvic brim. Large tumors rise above the brim in the same manner as the pregnant uterus and seldom cause constipation. Pelvic hematoceles, ovarian cysts, hematomata and large inflammatory exudates into the broad ligaments are often the cause, to some degree, of constipation. Malignant growths in the uterus or its appendages which cause stricture and involve the surrounding tissue, or secondary deposits in the pouch of Douglas, almost invariably cause constipation and inflammation of the sigmoid or rectum.

The perirectal tissue is often involved in female pelvic inflammations or abscesses, and it has been my experience to see a case in which three strictures of the rectum resulted from such an inflammation which extended to the rectal walls. Appendicular abscesses sometimes rupture into the sigmoid flexure, particularly those formed post-operatively. Abscesses which rupture into the rectum usually have very small openings and tend to repeated retention and discharge of pus, which is always a menace to the life of the patient from reinfection. An enema has been known to enter an abscess which opened in the rectum and cause infection of the peritoneum by bursting through the abscess wall.

By juxtaposition abscesses in the lower abdomen are limited by adhesions formed by the small gut, omentum, sigmoid flexure or the rectum. A pelvi- and retro-rectal abscess commonly originates from the female pelvic organs. The rupture of a tubal gestation through the bowel, with the discharge of blood and feces in one instance and the rupture and discharge of an ovarian cyst into the gut in another, have been recorded. As a rule, a retro-uterine abscess is associated with painful defecation which is referred high up in the rectum. These patients continue to suffer for a long while after the subsidence and absorption of the abscess cavity as a result of the scar. Scars which follow inflammations of the cervix, the parametrium, or tears in the cervix, are said to be common causes of constipation.

Rectocele. Separation of the levator ani muscles, partly or wholly, causes rectocele, and the patient not only suffers from the ordinary vaginal

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symptoms due to the bulging of the posterior vaginal wall, but from distortion of the rectal cavity and weakened physiological action of these muscles in defecation. Fecal accumulation and irritation of the rectum take place as a result.

The suffering caused by hysteria is sometimes mistaken for the pain of an ulcer. Hyperesthesia or hysteria of the rectum is defined by intense pain over the affected spot. It is distinguished from neuralgia by more constant pain of a burning character and is confined to a local area. In neuralgia the soreness produced on pressure is not so great, is more widespread and localized, as a rule, to the coccyx.

The diagnosis of a foreign body in the rectum is sometimes very difficult on account of the refusal of the patient to give any information as to their introduction, or, when insane, the unconsciousness of having committed the act. It usually produces pain within a short time after its introduction, particularly when the point or edges are sharp. The symptoms vary according to the character of the foreign body introduced, in the form of local reflexes, hemorrhage, proctitis, tenesmus and constipation and, in some instances, symptoms of obstruction. As a result of the injury an abscess may follow the presence of small, sharp pieces of metal, glass or wood.

A melancholic condition of the mind is generally noted in persons suffering from protracted anal and rectal diseases. This mental condition is probably due to the effect of pain and embarrassment. They usually hesitate to discuss the subject of their trouble with others and choose to bear their suffering without advice or sympathy. The mental condition of persons suffering from painful rectal diseases, such as fissures, hemorrhoids and ulcerations, is quite characteristic and constant. There is a depressed state of mind which depicts a most forlorn, hopeless and discouraged individual, particularly when repeated failures of cure have been experienced. These sufferers are often incapacitated for the ordinary occupations of life and, when men of business, sometimes fear the loss of their employment from the disinterest in commercial affairs due to their misery. Those suffering from marked constipation, associated with fissures or painful hemorrhoids, probably suffer from mental depression most frequently. Irritability of temper, sleeplessness and indigestion usually accompany pruritus ani.

Local and reflex symptoms in this region are, in some instances, so accurately defined that one hardly needs more than a suggestion of the chief symptom to form an idea as to the area affected. For instance, severe pain after defecation is almost pathognomonic of fissure in ano and is generally located by the patient in the anal orifice. There may be at the same time reflex pain, described as a soreness in the buttocks or extending down the inner side of the legs. Many individuals suffering from an anterior median fissure will unconsciously empty the bladder in response to an impulse originated at that point. This is also reflex. It is the common experience of surgeons to have to catheterize patients after hemorrhoidal operations, due to traumatism in the rectum affecting the nerves of the bladder. A hard kick or an injury to the perineal region generally inhibits the physiological act of urination.

Incontinence of feces is sometimes mistaken for diarrhea when the description of the ailment is accepted by the physician without due consideration of the causes other than catarrhal diseases. It is common in transverse myelitis and in all paraplegic conditions due to an injury of the spine in the lumbar region. Sometimes it occurs as a transient symptom in the severe prostration associated with acute and chronic diseases, as often manifested during the course of typhoid fever, cholera infantum, tuberculosis, and some cases of acute gastroenteric infection and pneumonia. Incontinence of feces is a common accompaniment of adynamic nervous conditions arising from any cause. Incontinence resulting from any of these factors may later change to an obstinate constipation. The relaxed and inactive sphincters may allow the escape of the bowel contents and by their inactivity, associated with the loss of sensation in the rectum, permit the feces to mass themselves, producing an impaction. This condition is then aggravated by the lessened secretion of mucus and the mass becomes caked. Incontinence of feces, associated with incontinence of urine, is one of the symptoms of a Jacksonian epilepsy and helps to distinguish it from other similar seizures.

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SIMPLE PROLAPSE OF THE PELVIC COLON.

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The pelvic colon or sigmoid flexure is that portion of the large intestine between the end of the descending colon, at the outer border of the left psoas muscle, and the rectum opposite the third sacral vertebra.

Prolapse of the pelvic colon corresponds to a beginning complete prolapse of the rectum of the third degree. In the latter the prolapse begins high up in the rectum or sigmoid and extends down into the rectal ampulla, but does not protrude through the anal orifice.

It is the early phase only of this process to which I wish to direct attention and, moreover, I shall limit my remarks to simple prolapse, *i. e.*, uncomplicated by lesions within the bowel, as neoplasms or stricture, or without, as adhesions, bands, etc.

The causes of prolapse are congenital and acquired. In the adult the normal sigmoid averages about 18 inches in length. It may be only 12, but often is 24 to 30 inches, as I have found by accurate measurement on 100 cadavers.

Likewise the mesosigmoid varies from almost zero to 6 inches and more in length. The wide range of motion of the pelvic colon, as a result of the excessive length of the sigmoid loop and of its mesentery, is the basic factor in the causation of volvulus and prolapse of the sigmoid and a certain type of constipation. Normally the feces accumulate in the sigmoid loop and the colon above. The filled bowel is dragged down in the pelvis across the rectum, thus increasing the acuteness of the recto-sigmoidal angle which is further fortified by an increase of the circular muscular fibers at this point known as the third rectal sphincter, described by O'Beirne. At the time of stool the normal sigmoid loop rises out of the pelvis, the recto-sigmoidal angle is largely obliterated and the contents of the descending colon, sigmoid and rectum are expelled.

However, in a given case, with the condition of an abnormally long sigmoid and mesentery, and with the baneful human tendency to postpone response to Nature's calls, feces accumulate and aggravate the congenital conditions. We then have an acquired constipation, or more correctly obstipation, as it is obstructive in nature.

A prolapse of the form under discussion is nothing more nor less than a mild degree of intussusception. The cause of intussusception, in practically all cases, is the violent peristaltic efforts on the part of the bowel to rid itself of a foreign body, be it an enterolith, scybalum, or some other object that has the same effect, as a stricture, neoplasm or polyp.

In the case under consideration, inspissated feces are the exciting cause. As a result of peristaltic efforts while straining at stool, the pelvic colon is invaginated into the rectum. It is reduced spontaneously. At first the only symptom is constipation. Later, as the result of repeated prolapses, the lumen at the recto-sigmoidal junction is enlarged, the invaginated sigmoid becomes congested, and, if unrelieved, ulcerated in certain cases, with discharge of mucus, pus and blood.

The prolapsed bowel conveys to the patient at stool the sensation of incomplete evacuation, and after defecation there is a bearing down or dragging over the loins and sacrum due to the drag on the mesentery.

A late but rather frequent syndrome which deserves special mention simulates intestinal obstruction.

This symptom-complex is due to a certain degree of volvulus of the redundant sigmoid about its elongated mesentery, and is characterized by constipation, distention and colicky pain in the left lower quadrant, and a feeling of nausea and headache, all of which are relieved by an evacuation of the bowels, considerable gas being passed with the feces.

Symptoms of intestinal toxemia may be present or absent, depending upon the protective properties inherent in the mucosa of the individual.

Diagnosis. There is always a history of chronic constipation with a feeling of incomplete evacuation at stool, and the victims are slaves of cathartics. An enema is promptly effectual. These patients have as a rule treated themselves, made the rounds of the dispensaries, or their physicians have prescribed without any attempt at reaching an intelligent opinion as to the nature of their constipation and accompanying symptoms. They may be

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of the enteroptotic habit, but even so, when the viscera are working in harmony in their abnormal relations, be they congenital or acquired, constipation does not necessarily follow. The enlarged sigmoid is usually felt with ease in the left iliac fossa.

By digital examination the rectum is found to be relaxed and capacious, and when the patient is asked to "bear down" the prolapsed pelvic colon meets it, imparting the feeling of the cervix uteri. The sigmoidoscope is, however, our chief reliance in diagnosis. This can be introduced readily about four inches, confirming the digital findings, and on inspiration, the prolapsed bowel protrudes against or into the lumen of the tube. If air is now gently inflated the pelvic colon is raised, and no difficulty is experienced in passing the tube through the large rectosigmoidal angle to a height of 10 to 14 inches, that is, to the apex of the sigmoid, which is found to be freely movable and also capacious.

The diagnosis is now complete, but for its confirmation a radiogram of the colon is desirable, following the administration per rectum of a suspension of bismuth or barium. Two x-ray plates should be taken, one with the patient prone, the other standing, to eliminate adhesions.

Treatment. The pathology indicates the treatment. Cathartics, while giving temporary relief, in the aggregate defeat their own end. The correct principle of treatment is to empty the bowel from below, regularly and systematically, till its physiology is restored. The ordinary enema of water with the addition of soap, salt, boric acid, etc., is of temporary benefit only.

In my experience olive oil meets the indications when properly administered. The instructions must be explicit. When disrobed for retiring, the adult patient assumes the knee-chest or Sims' posture, with the buttocks elevated, and administers to himself, or has administered, very slowly 8 ounces of warm olive oil from an agate irrigator elevated about 2 feet, to which is attached a short lubricated rectal tip. Then the patient retires immediately, resting on his left side for some time.

As the oil ascends it replaces the prolapsed colon. On arising in the morning the patient drinks a glass of cold water which stimulates peristalsis, and the bowels usually act then or after breakfast. The oil accomplishes five desirable purposes: It restores the pelvic colon to a more normal position, lubricates a dry mucosa, softens the inspissated feces, stimulates peristalsis by the formation of fatty acids, and by its partial absorption improves nutrition.

Some patients cannot retain this quantity of oil, but the maximum that can be retained up to 8 ounces is desirable.

After a week or fortnight the quantity of oil and frequency of administration are diminished, till finally the patient learns from experience when a dose is needed or he can omit it altogether.

The method of administering oil to children is different. They are placed prone and a No. 18 F. soft rubber catheter is inserted about 2 inches into the rectum. A small agate funnel is attached to the catheter and from 2 to 4 ounces of warm olive oil are slowly instilled. After withdrawing the catheter, the buttocks are compressed, and the child remains prone for some minutes and is then turned on his left side to rest.

As a further aid to the bowel to gain tonicity and position, a properly fitting abdominal belt is applied. A non-constipating diet is ordered. Strychnin, gr. 1-30, is given three times a day after meals to stimulate peristalsis. Exercise involving the abdominal muscles is advised. As an adjuvant or when the oil is discontinued, purified liquid petrolatum or Russian mineral oil may be taken in half-ounce doses three-quarters of an hour before meals, or on rising and at bedtime. This has been unnecessary in most of my cases.

I will cite briefly the histories of four typical cases; a child, a woman and two men:

Case 1. G. S., a girl of five years, referred to me in 1911, with a history of severe constipation the past year, indigestion, and passage of blood, both fresh and in clots, with stool. Pain and "bearing down" were severe at time of defecation. Weight 37¾ pounds, a loss of 4 pounds during the past four months.

In the knee-chest posture and without anesthesia the small calibered proctoscope was passed 9 inches. No polyps were present. The sigmoid prolapsed into the tube in the rectum, and at the recto-sigmoidal juncture there were superficial ulcerations from which blood oozed. Mucus was present in excess. Three ounces of olive oil were instilled every night. The constipation was relieved, the ulcers healed, and in three months the bowels acted nor-

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mally. She gained steadily in weight and is now quite normal for a child of her age.

Case. 2. Mr. C. M., aged thirty-eight, consulted me in 1911. During the previous ten years he had suffered a feeling of fullness and a throbbing dull pain in the left lower quadrant, and a dragging in the loins. The bowels acted fairly well, but at least once a week there was acute constipation, the pain and distention were increased, and headache and nausea were added. An enema relieved the symptoms. The x-ray diagnosis after a bismuth meal was cecal stasis. A tender sausagelike mass, 3 inches long, was felt in the left iliac fossa. The sigmoidoscope passed readily 12 inches. It showed a fairly normal mucosa and a prolapsed pelvic colon which was of large lumen and voluminous. An abdominal belt was ordered and oil enemas of 8 ounces were taken every night for two weeks. Bowel action became normal. The oil was reduced in quantity and frequency, until now he takes an injection about once a month. He is enjoying perfect health and weighs more than he ever did before. A partial volvulus of the sigmoid explains the attacks of acute constipation prior to treatment.

Case 3. G. R., a woman aged twenty-six, applied to Vanderbilt Clinic for treatment in June, 1913. She had always been well except three years ago, when she had an attack of acute indigestion. Following a large dose of jalap, the bowels moved freely and considerable pus (?) was in the stools. Discharge from the rectum, she said, had decreased gradually and was absent the past year. The bowels had remained very costive.

The chief complaint was dragging pain over the left iliac fossa, especially at night, causing restless sleep. Physical examination: General condition fair. Sphincter ani atonic. Proctoscope shows the rectal mucous membrane to be pale and dry. The tube cannot be passed into the pelvic colon, though the sigmoid protrudes into the rectum. Radiogram after bismuth enema shows prolapsed hepatic flexure, cecum in the pelvis, and sigmoid elongated.

Oil enemas were employed every night with relief from the first. She now uses oil about once every two or three weeks only, is not constipated and feels perfectly well.

Case 4. Last autumn I was called at night to see a physician, Dr. H., twenty-seven years of age, who was prepared for a laparotomy for acute intestinal obstruction. He was obstinately constipated, nauseated, had vomited and had severe pain and distention in the left lower quadrant. Temperature normal. He told me that he had always been constipated, but that he had grown progressively worse the past four or five years. By varying the cathartics he managed to keep his bowels open, although there was always a feeling of incomplete evacuation and dragging at stool. There had been several attacks similar to the present one, but not as severe.

Examination showed a well nourished man with lower abdomen moderately distended, tympanitic and fairly rigid. The sigmoidoscope passed easily 12 inches, and showed a rather pale mucosa and a wide recto-sigmoidal angle through which the sigmoid prolapsed, and above a freely movable, capacious sigmoid. A large quantity of gas escaped through the tube, and 4 ounces of olive oil poured in the tube were forced high into the bowel by the hand bulb. Symptoms of obstruction were relieved. At my suggestion he began the systematic use of oil enemas with the happy result of relieving his constipation and accompanying symptoms. A partial volvulus undoubtedly accompanied the prolapse in this case, causing the symptoms of acute obstruction.

During the past ten years I have treated a large number of cases of prolapse of the pelvic colon, both simple and complicated. On some I have performed sigmoidopexy (suture to the posterior sheath of the rectus), on others the meso-sigmoid has been shortened, but in none of the uncomplicated cases operated upon has the result been as satisfactory as by the simpler treatment outlined above. These are border-line cases indeed. In the hands of the surgeon who has not made a special study of them, operation would probably be advised as a rule. The simple cases already outlined are medical, while the complicated ones are surgical; hence the necessity of differentiating and recognizing to which class a given case belongs.

The oil treatment requires exact diagnosis, patience and attention to details. Its thorough trial will, however, eliminate the necessity for surgery in practically all uncomplicated cases.

230 West 59th Street.

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IMMUNO-THERAPY IN RECTAL DISEASES.

By G. H. SHERMAN, M.D., Detroit, Mich.

Rectal ailments are largely of such a character that surgical interference is of primary importance, but even here infections play no small part in the ultimate results, and not infrequently the original source of the diseased condition is an infection. Abscess formations in and around the rectum are not uncommon, and frequently they leave fistulous openings due to a prolonged infectious process. Rapid elimination of the infecting organisms with the development of healthy granulation offers the best prospects for a speedy permanent healing of these abscesses after drainage has been established. Immuno-therapy will accomplish this better than any other means. The immunizing influence of bacterial vaccines will cause the induration from inflammatory deposits to become absorbed more rapidly than would take place otherwise, and the discharge will consist mostly of serum. This thin serum-like consistency of the pus is characteristic of all purulent discharges when the patient is brought under the influence of vaccines, and this constitutes a very important factor in the healing of the abscess. When the discharge becomes thin, containing few pus cells, drainage is freer, and naturally the granulating surfaces come in closer proximity and thus facilitate the healing process. This is well illustrated by the results from the use of vaccines in fistulous openings. Many of these will close up permanently after vaccine inoculations where other measures have failed. In abscesses and fistulæ of the rectum, mixed infections with the colon bacillus as a factor are the rule. For this reason, a combined vaccine containing the colon bacillus, streptococcus, staphylococcus and pneumococcus should be used.

Many rectal diseases are purely of a mechanical nature requiring surgical treatment, and in most of these cases vaccines would seem out of place, but here their prophylactic value should not be lost sight of. Aseptic surgery in rectal operations is to say the least difficult, and this is particularly true where extensive operative procedures are necessary. By using the combined vaccine referred to above a day or two before the operation, and again a day or two later, enough immunizing resistance will have developed meantime so that infective processes in the operated tissues will not be nearly so liable to take place, and if there should be some infection, it will be brought under control before material damage is done.

NON-OPERATIVE TREATMENT OF RECTAL CONDITIONS.

By JEROME WAGNER, M.D., New York.

In order that there may be no misunderstanding the object of this paper, let me assert here, that only too few are the pathological states in or about the rectum which are amenable to other than operative treatment. Again, there may exist conditions where palliative non-operative measures may at first be resorted to, but in the end surgery is the only expedient. My contention in this class of cases is, that if there is any doubt regarding the effectiveness of palliative measures, operate in the very beginning rather than inconvenience the patient with frequent and, if not painful, at least uncomfortable treatments. Let us just consider the so-called injection treatment of hemorrhoids. It is quite true that in the hands of some men this procedure has been productive of good results. I have seen them; but also have seen failures. Now to me it appears that, if a hemorrhoid be so accessible that a solution can be injected into it, then why not a solution of novocain? This accomplished, a ligature and a sharp pair of scissors will do the rest, or even the clamp and cautery. No, one cannot admit to a great many advantages in using injections to cure hemorrhoids. At the New York Polyclinic Hospital, where the rectal clinics are a feature, this method is rarely employed.

On the other hand, in a condition known as external varicose hemorrhoids, where there is an engorgement of the veins about the rectum and anus, we usually find a spasmodic condition of the sphincter. Gentle, gradual dilatation is quite efficacious plus an astringent ointment containing adrenalin extract (suprarenal extract) and tannic acid in a vaseline base. Cold applications are also beneficial. This is the only hemorrhoidal condition where the treatment may be said to be purely non-operative. And though hemorrhoids may be the most frequent of all rectal troubles, they are by no means the alpha and omega of proctology.

A rectal condition often seen by the physi-

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cian is fistula. There are many different forms of fistula, and, curiously enough, it is the simpler ones that usually are first seen by the general practitioner, while the surgeon or proctologist usually meets the more extensive and complicated fistulæ. This is readily explained by the fact that the patient usually consults a general practitioner when symptoms first present themselves, consequently the fistula is usually in its earliest stage. Generally speaking, the treatment of fistula is operative. Beck's bismuth paste has been successful, and even the plain vaseline (sterilized) injections have been known to cure fistulous tracts. The formula for Beck's paste is subnitrate of bismuth, one part (33 per cent.), yellow or white vaseline 2 parts (67 per cent.). The vaseline should be sterilized by boiling, and while it is still hot the bismuth should be added. The latter must be pure and free from arsenic in order to avoid disagreeable symptoms. Care must be exercised that no water is mixed with the paste. To avoid this, the syringe used in the injection should, if possible, be sterilized with dry heat. The fistula to be injected is first cleansed by irrigation with peroxide followed with saline solution. It should never be curetted. The receptacle containing the paste is then placed in water and the water boiled. The paste becomes fluid, and in this state is drawn into the syringe. While still fluid, the nozzle of the syringe, which may be glass or rubber, is introduced into the opening of the fistula and the paste injected. Steady but not violent pressure should be used until the cavity is filled. The syringe is held in place until the paste hardens—sometimes a matter of fifteen minutes. This procedure may be repeated once, perhaps twice a week, until some result is obtained.

Now there is a type of fistula—a simple, straight complete fistula—which may be opened without use of scalpel or scissors. To assist in recognizing this fistula it might be well to bear in mind *Salmon's law*. A line drawn from one tuberosity of the ischium to the other bisects the anus. If the external opening of a fistula is anterior to this bisecting line, and within a radius of one and one-half inches from the anal margin, the internal opening will be in the anterior commisure, immediately internal to the external sphincter; but if the external opening is without the radius of one and one-half inches, or posterior to the bisecting line, then the internal opening will usually be in the posterior commissure and is not as likely to be a straight tract.

In other words, those fistulæ which can be classified under the first part of Salmon's law, are usually straight simple fistulæ, and this is the type, mentioned above, that may be laid open simply and without pain. A rubber band or a piece of silk thread is employed. Either answers the purpose, though the thread is more easily handled. A piece of thread about six or eight inches long is passed through the eye of a flexible, blunt edged probe. And let me here assert that in probing about the rectum or any mucous membranes, the only instrument to use is one of great flexibility. The probe is introduced into the external opening of the fistula and gently carried through the internal opening until the thread has been completely passed through, leaving one end protruding from the external opening, the other from the internal opening. The two ends are now tied as snugly as possible, without causing the patient discomfort. The patient is permitted to go about his affairs and told to return in about three days, at which time it will usually be found that the ligature is very much looser, due to the fact that it is beginning to cut through the fistula. If this is found to be the case, the knot is retied and the waiting process repeated. In from ten days to two weeks, depending upon the length of the fistula, the thread will have cut through completely, and the fistulous tract is opened as though with a scalpel. The wound is loosely packed, and the subsequent treatment is the ordinary post-operative management of fistula. Results are uniformly good. It is easily understood how the thread acts. The patient strains at stool, and the thread cuts into the tissue. Walking or any strain has the same effect.

It is the continual strain upon the thread that causes it to cut through the fistulous tract, but the process is so gradual that the patient experiences little or no pain. This is one of the most effectual of the non-operative measures resorted to in the treatment of rectal conditions.

The next condition that needs be mentioned is fissure, fissure in ano. This condition is so well known that I will not discuss its etiology, pathology and symptomatology except in so far as to remind the reader that oftentimes the symptoms are reflex, and for that reason the primary cause may be overlooked. Frequent urination is a very common reflex

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symptom, as is painful micturition. Sciatica and pains in the loins and back may be present and are due to impressions received by the exposed sensory nerves in the ulcer transmitted to the sciatic and iliolumbar nerves, which arise in close proximity to the trunks from which these sensory nerves are derived (Lynch, Diseases of the Rectum and Colon).

To cure fissure, rest and drainage are essential. It is of the utmost importance that the bowels should be kept well opened—not, however, by means of salts or other cathartics that may cause liquid movements, as these are most irritating to the ulcerated surface. The ideal eliminant is Russian mineral oil in tablespoonful doses before meals, or in such quantities as may be indicated.

The sphincter should be gradually dilated by the physician each day, if necessary, realizing that but little dilatation can be obtained at any one time. The patients may be advised to use dilators themselves, caution being counseled. Pure ichthyol applied locally to the fissure on a cotton swab is often efficient. If the ulceration is superficial, scarlet red ointment (8 per cent.), if used in conjunction with sphincter dilatation, may succeed when other local applications have failed. Or a silver nitrate solution, twenty grains to the ounce, may be applied, and I have used even the pure caustic stick successfully. True, surgery is frequently the only resource, but only too often because the proper local remedies have not been utilized in the beginning.

Probably the most distressing of all rectal conditions is the one known as pruritus ani. Regardless of etiology, pathology or duration, the symptom is always the same, painful itching about the anus. Whether it is a true pruritus ani or not, whether the itching is worse at night or during the day, one fact stands out, the patient wants relief, and if you do not afford that, he will go to some one who will. So do your utmost. It would be a waste of time to attempt to mention all the remedies that have been recommended; the full list may be found in any complete work on the rectum. However, there are some cardinal rules, which it is of paramount importance to follow. First, the parts should be kept scrupulously clean. After each bowel movement, soap and water, if necessary, should be employed to accomplish this. Second, ascertain what, if any, rectal or anal abnormality be present. This, when found, should be treated accordingly. Third, protect the part. It may be an irritating vaginal discharge that must be guarded against, or the irritation of clothing. Fourth, if laboratory facilities are available, take a culture of the affected and perhaps infected area. To do this, first wash the part with soap and sterile water, then with saline solution. Swab this cleansed area with a sterile swab, and plate or else implant in a tube of bouillon culture medium. The pathologist will do the rest. Should a pure culture be obtained, have an autogenous vaccine made and employ this and, as Murray advises, start with heroic doses.

The constitutional condition of the patient should always be investigated and any idiosyncrasies as to food or mode of life must be corrected. Should a condition of moisture be present, the following lotion, followed with a dusting powder of zinc stearate, is excellent:

℞ Calamine 40 grains
Zinc oxide 20 grains
Liquor carbonis detergens ... 3 drams
Glycerin ½ ounce
Aqua calcis 1 ounce
Aqua q. s. ad 5 ounces
Sig.—Apply twice daily.

If there is much maceration of the skin present, it is well to paint the entire area with a solution of silver nitrate twenty grains to the ounce, following with some dusting powder as starch or zinc stearate. Complete cure has been the result after repeated painting with pure tincture of iodine. The doctor's judgment and patience are often put to a severe test, as none of the mentioned remedies is a panacea. Where iodine often fails, a mixture of equal parts of argyrol and ichthyol will succeed. Here also a gradual stretching of the external sphincter muscle is always in order. It can do no harm, as a forceful dilatation is never possible without an anesthetic. But above all things, give the patient relief, and he will thank you and frequently pay you as well.

There are other conditions where non-operative treatment is effectual and curative. Amebic dysentery has a curative specific remedy, emetin, a derivative of ipecac, which is injected hypodermatically. Syphilitic ulcerations respond to salvarsan and mercurial preparations. Tuberculous ulcerations require general as well as local treatment. The most recent

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successful agent for some of these cases is radium. When the ulcers are accessible, pure crystals of potassium permanganate are sometimes helpful. Before applying, however, cocainize the part well, as the application is very painful.

In conclusion I desire to lay great stress upon the most important of all non-operative procedures in and about the rectum and that is *a careful, thorough examination*. Do not be satisfied with the patient's statement, that he is suffering from piles. See for yourself. Place the patient upon his left side with thighs and knees flexed. Look at the anus. Place a finger cot over your right index finger, and after applying a goodly quantity of vaseline, insert it into the rectum. Then gently explore. An irregular mass will often belie the statement of bleeding piles, and your early discovery of an operable carcinoma will have been instrumental in saving the patient's life. And, as you use your vaginal speculum, so use your proctoscope or rectal speculum. You will be sure to make many interesting discoveries both to your patient's satisfaction and your own glorification.

12 W. 44th Street.

THE MODERN PROCTOSCOPE IN DIAGNOSIS AND TREATMENT.

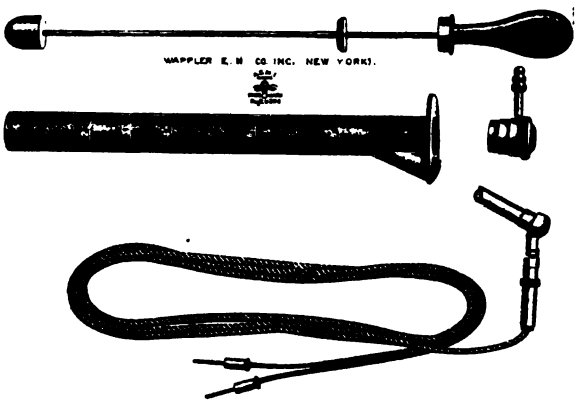
By FRANK C. YEOMANS, A.B., M.D.,
New York.

Of all the instruments for the examination of the terminal bowel, the proctoscope is the most valuable.

The beginning of modern proctoscopy dates from the familiar Kelly tube, of 1895, which depends upon atmospheric air for dilatation and light reflected from a head mirror. The modern proctoscope has electric illumination and auxiliary inflation by the hand-bulb when atmospheric pressure is inadequate.

Among the points of excellence in my instrument (Fig. 1) are: A smooth end that can be introduced without trauma, direct illumination from the proximal end by a standard, durable tungsten lamp, activated by a two-cell dry battery or the street current regulated by a controller. It is sterilized by boiling and has an interchangeable light carrier.

The tubes vary in length from six to fourteen inches and in caliber from one-half to one and one-eighth inches, the latter for operations. In general practice the ten-inch tube of three-fourth-inch caliber fills most requirements, though the tube of one-half-inch diameter is very useful in painful anal conditions, rectal tumors and strictures, and in children.



YEOMANS' PNEUMO-ELECTRIC PROCTOSCOPE

Fig. 1.

Auxiliary instruments for use through the tube are dressing forceps, specimen forceps, curette, snare, Martin hook and applicators, all of the same general pattern as are used through the bronchoscope.

Preparation of Patient. The bowels should be emptied by an ounce of castor oil taken the night before the examination and, when necessary, by a low enema two or more hours before. All constricting bands must be loosened at the waist and neck.

Technic. Three positions have been employed for the examination: (a) the left lateral (Sims') with hips elevated; (b) lithotomy, used in some continental clinics when the patient is under an anesthetic, and (c) the knee-chest. The lateral position is sometimes used when the patient is very stout, debilitated by disease or has ankylosis of the hip or knee. The lithotomy position can be employed satisfactorily only when the patient is under a general anesthetic. Barring the exceptions mentioned, the knee-chest posture is of general application, and is carried out in the office without anesthesia. Failure to insist on the correct knee-chest posture accounts for unsatisfactory proctoscopy. The shins should rest on the table, the feet hanging over its edge, the left arm, flexed at a right angle, is carried across the body, and the patient rests on the left shoulder on a wedge-shaped cushion, head turned to the right. The spine is allowed to fall forward

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and the abdominal muscles are relaxed, tested by palpation, thus allowing the pelvic viscera to prolapse toward the diaphragm (Fig. 2).



Fig. 2.

Digital examination always precedes the introduction of the tube. Neglect of this precaution has resulted in disaster, as evidence the reports of bowel perforation, many of which proved fatal from peritonitis.

Vaseline is by far the best lubricant for the tube, though a stiff jelly is indicated if topical applications are to be made.

Now with firm pressure the tube, warmed and well lubricated, is pressed firmly but not forcibly against the anus in the direction of the anal canal, *i. e.*, toward the umbilicus, and is readily introduced into the ampulla. The obturator is now removed, the light attached, and as the tube is advanced examination is made under direct vision.

The mucosa is recognized as normal or, as in the case of other mucous membranes, dry, red and atrophic, often with particles of inspissated feces adherent; or hypertrophic, pale and succulent with excessive secretion as mucus glares. Superficial veins, dilated and prominent, denote portal obstruction.

The experienced examiner can recognize the majority of ano-rectal ailments by inspection and palpation. There remains, however, a large number of obscure and difficult cases, a very considerable number of which can be diagnosed promptly and correctly by the proctoscope. Of course successful proctoscopy implies not only a correct technic, but also a knowledge of the usual and rare pathologic conditions that occur in the lower colon and rectum and wide clinical experience in the correct interpretation of the proctoscopic findings.

Inflammation may be acute or chronic, resulting in ulceration. In the beginning some rectal ulcerations present a characteristic picture, notably amebic dysentery, but, when long established, extensive ulcerations tend to assume the same general appearance from the secondary (mixed) infection of the omnipresent bacterial intestinal flora. The extent and character of ulcerations are observed, and smears taken directly from their surfaces may reveal at once, under the microscope, the specific nature of the infection. This is particularly true for amebic and tuberculous colitis. A Wassermann blood test is, of course, to be made in all doubtful cases. Hemorrhagic colitis, the nature of which is still little understood, is easily recognized. Another type of inflammation sometimes found is a colitis characterized by extensive superficial ulceration, spawn-like muco-pus discharge, a thickening of the bowel wall and narrowing of its lumen. It is imperative to recognize this condition early, for if suitable surgical treatment is neglected stricture is almost sure to develop.

The loose, prolapsing sigmoid falls directly into the tube and is a frequent cause of chronic constipation in children and the aged and at times of local ulceration.

Houston's valves can always be seen. In my experience they seldom cause constipation (obstipation). Evidence of their transformation into fibrous tissue and consequent ability to obstruct is determined by a hook bent at a right angle and passed through the proctoscope, dragging on the free margin of the valve.

The vast majority of strictures and tumors are within reach of the examining finger. However, a certain number of tumors are situated so high as to be discovered only by direct vision. Of the benign growths, the solitary polyp with a long pedicle implanted high, which allows the tumor to recede before the examining finger, can be detected only by the instrument, and its removal promptly effected by the snare. Multiple adenomata can seldom be felt, but their presence and distribution are recognized at once through the tube. The significance of this lies in the fact that about 50 per cent. of these cases, when neglected, undergo malignant change. So also malignant growths and strictures at and just above the recto-sigmoidal juncture are clearly seen.

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The tube of small caliber can be passed through the lumina of strictures and neoplasms to the healthy area above, thus defining their limit—data of prime prognostic import. Specimens may be removed from new-growths for microscopic examination, though this is seldom necessary for the clinically experienced.

The tube can be passed into the sigmoid in about 75 per cent. of cases, but the anatomic limit of advancement is the apex of the sigmoid which varies with the individual from 10 to 14 inches from the anus. Fortunately it is in the cases requiring examination—large and prolapsing sigmoids and growths and strictures situated high—that the tube can be passed most readily and furnishes information of the greatest value. After the tube has been introduced into the sigmoid it is gently swayed from side to side. Pain caused by its introduction, inflation of air or the swaying, suggests adhesions or bands that prevent the physiologic emptying of the sigmoid at stool.

Treatment is by topical applications and by instruments. The removal of a single polyp by a snare has been mentioned. Houston's valves when proved obstructive are divided in seven to ten days by a Pennington spring clip applied through the proctoscope. In cases of spasm at the recto-sigmoidal juncture the tube passed through at intervals will tend to overcome this condition. Adhesions and bands that limit the normal movements of the sigmoid may also be stretched or broken up when the sigmoidoscope is introduced repeatedly, swayed from side to side and air inflated. Topical applications are made directly to ulcers. Larger quantities of medicated aqueous or oily solutions may be applied over large areas by pouring them into the proctoscope and employing pneumatic pressure when needed.

We have all seen cases of irritable ulcers of the rectum or painful hemorrhoids, in which the patient shows signs of a general toxemia or stasis with symptoms referable to the stomach, and a general loss of weight due wholly to the protective contractions of the sphincters above caused by the irritation below. When we remove this source of irritation, we have all noticed the rapid return to health and weight.—Dr. J. E. Johnson (*Memphis Med. Monthly*).

URETHRAL DIVERTICULA AND CUL-DE-SACS.*

By NOAH E. ARONSTAM, M.D., Detroit, Mich.

Urethral diverticula and cul-de-sacs are anomalies of development and are by no means so rare as some authorities would lead us to believe. The literature on this subject is unfortunately meagre, and the little information one does gain on perusing it is very inadequate, so that one is tempted to regard these defects at best but as extremely infrequent ones affecting the urethral mucosa. Genito-urinary surgeons of vast experience have treated the subject in a very perfunctory manner, and have paid but little attention to it in text-books or otherwise.

The reason why these urethral malformations are not oftener encountered may be explained by the fact that they give rise to no inconvenience in the patient under normal conditions, and are only accidentally discovered while examining the urethra for other lesions.

As already intimated, the author, finding nothing of interest recorded in the literature, had to rely solely upon his own resources in the elaboration and description of the subject designated by the title. This article is largely based upon a number of cases witnessed by him in private practice.

VARIETIES.

There are two forms of these urethral anomalies, viz:

(1) The *diverticulum*, a short, linear, narrow, collapsible pocket opening into the urethral canal, from one-fourth to one-half inch in length, of the caliber of a moderately sized probe, unyielding and non-dilatable, and

(2) The cul-de-sac proper, a larger, longer and more distended pouch, stopping abruptly or rather terminating blindly in the mucous lining of the urethra, seldom exceeding one inch in length and somewhat larger than the preceding one in caliber.

Both of these varieties are congenital anomalies, rarely found further down than the first two inches of the anterior urethra, and are in most instances situated on the floor of the canal, thus distinguishing them from enlarged and patulous urethral follicles that are commonly located on the roof of the urethra, in proximity to the fossa navicularis.

Of interest to the histologist is the embryologic phase of these small developmental errors. The only

* Read before the Maimonides Medical Society.

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plausible theory the author is able to venture regarding their embryonic evolution, is the faulty closure of that part of the genital cleft concerned in the formation of the urethral tract, synchronous with faulty or delayed participation in the development of the epiblast lining it. Instead of the embryonic units uniting and blending at the proper period, they suffer a process of interruption or mal-development, and eventuate into the above-mentioned peculiarities of the urethral wall.

As remarked before, they are only accidentally detected either on direct inspection and by means of the urethroscope, or as a result of urethral instrumentation in the form of sounds or similar instruments employed for therapeutic or diagnostic purposes.

They are apt to engage the point of the advancing instrument, and if the operator still persists on meeting these obstacles in forcibly propelling the sound, he may not infrequently lacerate or even perforate the blind extremity and thus establish a channel of communication between the cul-de-sac and the urethral canal.

SYMPTOMS.

As mentioned elsewhere, these anomalies give rise to little discomfort, but when once the seat of inflammatory involvement they may prove annoying and exceedingly rebellious to treatment, unless they are radically attacked by the method the author is about to outline.

These anomalies may occasionally produce very vague symptoms, which are apt to puzzle the physician. They may, for example, simulate a mild case of urethritis, while the history and accompanying symptoms do not at all warrant such a diagnosis. They are, moreover, the cause of many a case of prolonged urethral discharge, a veritable "urethrorrhea," as it is termed by some, while microscopic examination reveals nothing of importance that could furnish a clue to the existing pathological state.

Among other symptoms occasioned by them in a number of instances, *painful micturition* and *urinary tenesmus* may be pointed out. Should they become implicated in a gonococcic process concomitantly invading other portions of the urethral tract, they may form the starting point for stricture of various kinds, particularly that of the *longitudinal or band-like type*. They may also prove a prolific source of protracted suppuration, which is persistent and stubborn and does not seem to yield to the most painstaking and thorough treatment until the real cause of the malady is perchance discovered. The urinary stream in these cases of urethral diverticula is irregular, either radiating and bifid, or thin, rotating and spurting, and necessitating some effort on the part of the patient to expel it. This is falsely attributed to the presence of a stricture and erroneously treated for it. Should the sound, which is chiefly used for the latter condition, happen to be of small size, it may promptly engage in the opening of the pouch or diverticulum and refuse to advance, when the exact nature of the lesion may be readily ascertained. Many more symptoms may be detailed, but the above are the main ones demanding our attention.

TREATMENT.

The treatment of these urethral defects is decidedly simple. It consists in first discovering the precise location of the sac or canaliculus by means of the urethroscope, or if this be not available, with a small sound or probe, or a very fine olivary bougie. With the urethroscope in situ, the lacunar fold is then slit open with a small knife or tenotome throughout its entire extent to the very bottom of the urethral mucosa; or, after the site of the channel or sac has been located, a urethrotome may be introduced and by a sweep of the delicate blade the pocket divided. Local anesthesia usually suffices to accomplish this result.

As soon as the fold of mucous membrane has been severed, this should be immediately followed by the insertion of sounds in ascending sizes until the largest can be conveniently passed, and left in situ for at least ten minutes each time. This must be continued for a week or ten days to prevent the too premature closure or healing of the divided edges, or subsequent fibrous contraction, which may ultimately lead to stricture formation. The two lateral bands become atrophied and at a level of the urethral canal. Rarely is the fold of mucous membrane so extensive or overlapping as to require ablation or removal *in toto*. Another method that may be utilized is to dilate the urethra either with a urethral dilator or, what is still simpler, with a pair of ordinary dressing forceps gently introduced and expanded to its utmost limit, provided, however, that the cul-de-sac is not situated too far posteriorly

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—severing the band of the pocket by means of a very small scissors and then proceeding in the manner delineated above.

In conclusion the author wishes to emphasize the rule, that in all cases of chronic urethral discharge without any appreciable or assignable cause as a basis, one must always be on the lookout for these annoying little anomalies and institute a thorough investigation for their possible presence.

32 Adams Ave. W.

A CLEAR CASE OF SEXUAL PERVERSION.

By J. N. VANDER VEER, M.D., Albany, N. Y.

Cases of perversion against nature's normal use of the genital organs are not infrequently discovered by the careful medical man, either in the taking of a history or in making a physical examination; but they do not often find their way into the medical literature at the time unless a series of such a type presents itself.

The following case may be of interest as representing a problem rather difficult of solving, owing to its unique character.

Mr. D. M. was sent to me August 9, 1913, by Dr. Reynolds of this city, with the statement that he had about a half ounce of paraffin in his bladder and wished to have it removed.

Mr. M. gave a history of having some sixteen years ago suffered from a gonorrhea, which he treated himself and was cured in two months. For some time after that he had a stricture (prostatitis or vesiculitis?) which he cared for with a sound, but for ten years past he has been perfectly well, has married, and now is the father of two children. He has always been very passionate and sexually inclined, but occasionally has had no sensation in ejaculation.

About July 15th, his wife "went to the country" to spend the summer, while he stayed at home and worked at his usual vocation of railroad engineer.

On July 29th, he felt a "tickling" in his deep urethra and prepared himself for a sexual debauch, but thought he ought to "stir up his privates to make sure they would work properly."

Having nothing at hand for this purpose he bethought himself to make a sound which would reach the desired spot. So he rolled up some paper over two lead-pencils, placed lengthwise, and in this way made a form, into which he poured some melted paraffin taken from the top of jelly glasses in his cellar, thus making a sound to touch the spot. Lubricating this home-made instrument with vaseline he introduced it into his urethra and pushed it back as far as it would go, and then proceeded to draw it back and forth, until suddenly he had a spasm of his sphincter muscle, a sharp pain, and on withdrawing his sound he noted that only about one-half of it came away.

He felt ashamed of his act and did not seek medical advice until August 4th, and even then did not tell the doctor of his act, simply complaining of a soreness in the bladder. The diagnosis of cystitis was made from the clinical symptoms and vigorous treatment instituted, but by August 8th the condition had grown much worse and he was referred to me, having confessed to his doctor of the act.

By forcing direct questions and pinning him down in his answers, I managed to obtain his whole story. So I cystoscoped him on August 9th, eleven days after the act was committed, and found a mass of paraffin floating in the bladder. This had lost all shape of the sound owing apparently to the low melting point of the paraffin. His bladder was markedly inflamed and exceedingly sensitive, and the problem then resolved itself into how the foreign body could be removed without a major operation. I dared not attempt the use of solvents in such an irritated bladder, and resolved to attempt



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the extraction of the paraffin by means of the operating cystoscope, or Young's cystoscopic rongeur, but finally was compelled to resort to a large sized lithotrite for the purpose of biting off chunks of sufficient quantity. By means of a local anesthetic I managed to render his urethra and bladder less sensitive, and then alternating the lithotrite and the cystoscope in their introduction, I removed the major portion of the mass with some six insertions by means of morcellement, and the last piece was taken out with the cystoscopic rongeur.

The after-treatment consisted in simply healing the cystitis, and a cystoscopy done September 8th showed the bladder to be perfectly free of its infection, and examination of the prostate and vesicles demonstrated that his genital tract was in a normal condition.

Thinking that it might be of interest, I append a photograph of the pieces of paraffin in the order in which they came from the bladder.

28 Eagle St.

STRICTURE OF THE URETHRA.

By LEWIS WINE BREMERMAN, A.M., M.D.,
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Stricture of the urethra is a localized narrowing of the normal caliber of that canal. Strictures are divided according to their etiology into three varieties: Congenital, acquired, traumatic.

The congenital type is one that has existed since birth and is usually situated at or near the meatus or fossa navicularis or both.

An acquired stricture is one that is due to disease, such as gonorrhea, chancre or chancroid. Strictures following chancre or chancroid are situated as a rule at or near the meatus. The most common location for stricture following gonorrhea is at the bulbo-membranous junction or anterior to this region.

Traumatic strictures are those which follow injury. The injury may be from without, as that caused by falls or blows upon the perineum. Gunshot or stab wounds may be followed by stricture if the urethra is implicated. This form may occur at any portion of the urethra; the membranous portion may be involved or even the prostatic portion may suffer. Traumatic strictures may be the result of injury to the urethra from within, produced by unskillful instrumentation or by the injection of caustic drugs, such as strong silver nitrate, bichloride or carbolic acid solutions. These strictures produced by chemicals are for the most part situated in the anterior urethra two or three inches from the meatus. Instrumental injury may occur at any portion of the canal, usually at the bulbo-membranous junction.

It will be seen that strictures most frequently occur in the anterior urethra. They may be situated in the front or the deep portion of this area.

Strictures vary in form and are classified as follows:

Linear strictures, like a small band around the urethra, are produced by thin unyielding fibrous tissue.

Annular strictures are similar to the linear, but of greater width, resembling a wide ring around the canal.

An irregular stricture is composed of thickened areas in different places along the urethra; these usually do not surround its entire caliber.

A tortuous stricture is, as its name implies, irregular and winding in character due to different thickness in the formation of fibrous tissue along the canal.

A hard fibrous stricture is one which will be difficult of dilatation.

Resilient stricture is one which readily dilates but returns to its small size as soon as the instrument is removed.

The symptoms of stricture are so clearly defined that they may be classified under three heads: Discharge from the urethra, pain, disturbances of micturition.

In cases where there has been long standing chronic discharge, commonly termed gleet, stricture of the urethra should be suspected, particularly where it is associated with pain in the perineum, along the urethra, or reflected occasionally to the supra-pubic region, together with disturbances of micturition, as a diurnal frequency with or without pain. When these symptoms exist the diagnosis may be made with a reasonable degree of certainty.

The tentative diagnosis made from the symptomatology can be verified by a careful examination of the urethra. The form, situation and character of the stricture must be ascertained before the treatment can be planned, as different varieties require

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different treatment. Direct examination of the urethra is best accomplished with flexible bougie-a-boules, beginning with No. 14 F.; if this will not pass, resort to successively smaller sizes until one is found that will go through; on withdrawing the instrument the contraction can be felt as the acorn tip of the instrument catches up the fibrous mass. If No. 14 F. passes easily, successively larger sizes are inserted until one is found that will not pass.

The urethroscope also is an instrument of precision, and a narrowing in the urethra may be distinctly seen through this instrument. By these methods of examination the surgeon can accurately determine the form, size, number and position of the stricture.

The surgeon should be familiar with the normal urethra, and the rules of Otis regarding the relative size of the normal urethra to the circumferences of the penis should not be forgotten.

Circumferences of penis			3	in.; urethra		30	m. m.	Fr. scale.	
"	"	"	3¼	"	"	32	"	"	"
"	"	"	3½	"	"	34	"	"	"
"	"	"	3¾	"	"	36	"	"	"
"	"	"	2¾	"	"	28	"	"	"
"	"	"	2½	"	"	26	"	"	"

These measurements are important to remember, as an individual with 3¾-inch circumference of the penis may have a stricture admitting a 26 F., which is producing symptoms, and which might otherwise be overlooked, since the surgeon may conclude that the urethra is sufficiently large. Again, in individuals with a smaller organ (2½-inch circumference and 26 F. caliber normally) great harm with marked trauma may be produced if this canal be overdilated.

Treatment of stricture of the urethra may be divided into the following methods: (1) Rapid dilatation. (2) Gradual dilatation. (3) Continuous dilatation. (4) Electrolysis. (5) Internal urethrotomy. (6) External urethrotomy. (7) Internal external urethrotomy.

Rapid dilatation has been practically discarded by the best surgeons, as the results from this method have not been satisfactory. Through the trauma produced by this form of treatment the stricture condition is usually increased.

Gradual dilatation is the operation of choice and will be followed by good results in about 95 per cent. of acquired strictures. It consists in the introduction of an instrument that will pass conveniently through the stricture, remembering that metal instruments below 14 F. are contra-indicated, as their small sharp point may produce considerable trauma even in the best of hands. Strictures below 14 F. are best dilated with flexible olivary-tip bougies. The largest that will conveniently pass through is used; this is left in place for from five to ten minutes and the next size introduced and left in for the same length of time. Two sizes at each sitting are sufficient. The second sitting should be about three days after the first, using larger instruments at each successive one.

After the stricture is dilated to 15 F. an Oberlander instrument may be employed instead of sounds, and above 20 F. the Kollmann may be used. Sounds will answer the purpose as well as these instruments. Following all instrumentation of the urethra a gravity irrigation by the Janet method should be given, consisting of solution of silver nitrate 1-12,000, potassium permanganate 1-8,000, or formalin 1-800; this should be allowed to run into the bladder. An antero-posterior injection of the milder silver salts may be substituted for the irrigations. If this technic is followed urinary fever will rarely occur.

About 50 per cent. of the acquired strictures will demand either an internal or external urethotomy, or both, as in this variety are included the hard, fibrous, undilatable strictures, the resilient strictures, and those located in the anterior portion of the canal, from two to three inches from the meatus.

Continuous dilatation is of service where the stricture is of exceedingly small caliber and will only take a filiform or two. Those may be left in place for twenty-four hours, and at the end of this time three or four more filiforms may pass through the canal, and gradual dilatation may then be started.

Electrolysis is mentioned as a form of treatment of strictures, but I simply refer to it here to condemn it, as the results are not good and complications may occur which are serious.

Urethrotomy, either external or internal or both, is the operation of choice in all congenital as well as in all traumatic strictures.

Internal urethrotomy should never be done at a point lower than four and one-fourth inches from the meatus; cutting the artery of the bulb is a danger that may follow if this is not borne in mind. It is frequently quite difficult to control hemorrhage in this location.

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External urethrotomy is performed either with or without a guide. If an instrument can be passed through the stricture serving as a guide for finding the urethra, the operation can be easily done, but without a guide it is frequently very difficult. It is occasionally necessary to perform a supra-pubic cystotomy and retrograde catheterization for the purpose of locating the urethra.

In treating urethral stricture, whether the method employed is dilatation or urethrotomy, instruct the patient that once an individual has a stricture he will always have one, and that it is absolutely essential for him to receive treatment now and then for the balance of his life. One or two treatments yearly, consisting in the passage of a sound the size of the normal urethra, will usually suffice.

One word of caution regarding the technic of examination. It is not wise to use local anesthesia, for with the urethral mucosa anesthetized the operator may be tempted to apply too much force in his instrumental examination and may produce considerable trauma. Usually the pain experienced by the patient is an excellent criterion of the amount of force to use in the urethra. It is best to never apply any force in endeavoring to pass an instrument through a stricture. The weight of the instrument itself should be sufficient to carry it along the urethra.

It might here be well to add a few words concerning the treatment of acute retention of urine as the result of a stricture. It is never wise to resort to too much urethral instrumentation. After all palliative measures have failed, gentle instrumentation may be instituted, remembering that injuries to the urethra may be followed by extravasation of urine which is a very serious complication. It is not unusual with care to get one to two filiforms through the stricture. Continuous dilatation may then be employed, and frequently drainage of the bladder can be accomplished in this manner.

It is not an uncommon practice with me to use ureteral catheters; these are made as small as No. 4 F. and may go through a stricture and into the bladder when no other instrument will do so.

If it is impossible to gain entrance into the bladder there is no objection to aspiration of that viscus. Under no circumstances should an overdilated bladder be completely emptied, as complications, such as anuria or hemorrhage, may follow. If a trocar is employed there is no reason why the plan first suggested by Wishard cannot be adopted successfully. He uses a trocar sufficiently large in caliber to pass a small rubber catheter through; the trocar is then removed, leaving the catheter in place. The bladder can be drained gradually by this method.

To summarize, the following suggestions may be offered:

Don't forget that the diagnosis is important before a plan of treatment is instituted.

Don't forget that forcible instrumentation is contra-indicated.

Don't forget that irrigations and injections should follow intra-urethral or intra-vesical instrumentation, thus preventing urethral fever.

Remember that gradual dilatation is the method of choice in this treatment of stricture.

Remember that the patient must be instructed in the proper course to follow after the stricture has been fully dilated or after an urethrotomy.

Remember that an over-distended bladder should not be relieved suddenly.

Remember that a ureteral catheter may be a very serviceable instrument in draining the over-distended bladder which is the result of stricture.

Remember that all strictures will not respond to any one line of treatment, and above all remember that skill and care are essential, as trauma may be followed by serious complications.

104 South Michigan Ave.

PREVENTION AND TREATMENT OF GONORRHEAL EPIDIDYMITIS.

By FAXTON E. GARDNER, M.D., New York.

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Epididymitis is not a frequent occurrence in cases of gonorrhea treated correctly and regularly. Some authors even go so far as to say that it is not seen under such conditions. I have not been quite so fortunate, but, in my hands, a proportion of 3 per cent. has not been exceeded under those circumstances.

On the contrary, epididymitis is one of the most common complications of gonorrhea when treated improperly. From what I have been able to observe in dispensary practice, 10 to 12 per cent. is a rather conservative estimate of its frequency there.

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If we accept these figures we must conclude that out of every three cases of epididymitis, one, perhaps, cannot be avoided, whatever care is taken, but two are preventable by proper attention. While such statistics are necessarily but approximate, I believe this conclusion to be very near the truth. There is a certain number of cases in which the most cautious treatment seems unable to ward off the development of epididymitis; but there are far more numerous cases where the latter can directly be traced to non-observance of the rules of treatment. These cases could have been, and ought to have been, prevented.

Our duty in regard to the prevention of epididymitis is all the greater because it constitutes a markedly unfavorable element as to a complete cure of gonorrhea. Leaving aside the question of relapses, always possible after a first attack, I often have noticed how difficult it almost always is to get patients having had epididymitis truly rid of their disease and how difficult it sometimes is to keep them free from systemic manifestations. Both facts are readily accounted for by the length and area of tissues necessarily involved in epididymitis and their inaccessibility to ordinary means of disinfection. Therefore, we must consider epididymitis, not only as a very painful complication which puts in jeopardy the functional capacity of the corresponding testicle, but also as an important factor of aggravation of the prognosis.

The rules of particular concern in preventing epididymitis are easily deducted from a few considerations on its mechanism of production. It results from the combination of posterior urethritis accompanied by infection of the urethral openings of the ejaculatory ducts, and of local trauma, which acts as the determining element of the epididymal metastasis. The sphincteric ring which surrounds the urethral end of the ejaculatory ducts is generally sufficient to stop the propagation of infection along the spermatic channels; but, should it be weakened, and infectious material be forced into the ejaculatory ducts, epididymitis is very likely to occur, especially if, at the same time, the urethral orifice is obstructed by swelling or otherwise, as then all chance of back drainage into the posterior urethra is gone and the vas becomes the line of least resistance for the spread of infection.

Local trauma may be direct, as for instance, in the passing of an instrument in an acutely inflamed canal; but it also includes anything that induces violent congestion and sudden increase in pressure in the prostatic urethra. Sexual intercourse, or masturbation, during the acute or subacute stages of gonorrhea is very often followed by epididymitis, because we have there these two elements present simultaneously. On the other hand, alcoholic and dietary excesses, though they cause most violent flare-ups of the urethritis and often result in acute prostatitis, have not been, in my experience, as potent factors in epididymitis as generally admitted, probably because the element of local trauma is there comparatively lacking.

Increase in pressure and forcing of the ejaculatory sphincter is also the explanation of epididymitis occurring after a thorough irrigation of the urethra given in acute posterior urethritis, when the inflammatory symptoms in the posterior urethra are too violent. The irrigation fluid, in order to overcome the resistance of the swollen vesical neck and contracted sphincter, must be at high pressure in the posterior urethra, and leaks into the ejaculatory ducts.

It is somewhat more difficult to account for the epididymitis that often occurs after injections of too strong solutions, or of too large amounts, in the anterior urethra only. But it occurs with such a frequency that we must perforce see more than a mere coincidence in their relation.

Of course, abnormal patency and loss of tonicity of the orifices of the ejaculatory ducts greatly favor the development of epididymitis. Such a condition is demonstrated by urethroscopy in a number of cases of chronic posterior urethritis. I believe it explains those cases in which relapses of epididymitis occur after any treatment of the posterior urethra, however gently given. I have now such a case under treatment.

Local trauma affecting the testicle has also a localizing influence as to epididymitis. Here again we must understand by local trauma not only blows and direct injuries, but also simple lack of protection against the slight and incessant jarring to which the testicle is normally submitted. How such a slight jar may call down, from a considerable distance, the inflammation on the epididymis

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is not easy to explain, but clinical evidence leaves no doubt.

The part played by physical strain is strikingly illustrated by the fact that of all New York City firemen I have treated for acute gonorrhea, all but one developed either epididymitis or arthritis, or both, and the one exception is a man who has in the fire house the reputation of not being overactive.

The place formerly held by horseback riding in the production of epididymitis has been taken in recent years by two modes of physical entertainment very much in vogue presently, namely, dancing and automobile riding, and especially driving. It has been my experience that a chauffeur suffering from acute gonorrhea, who will not, or cannot, give up his work for a while, is practically certain to develop acute prostatitis, and very liable to develop epididymitis. I have had lately two cases very much to the point, in which a long automobile ride, which I had forbidden and which the patient nevertheless felt constrained to take for business reasons, was followed, within twenty-four hours, by a severe attack of epididymitis.

It will readily be seen that all the causes of gonorrheal metastasis in the epididymis are straight violations of well-known rules of treatment. Indeed, the prevention of epididymitis may be very tersely summarized in the words: Observance of the rules. This is a threadbare truth, but if we take into account facts as we see them in actual practice, we cannot but feel that some threadbare truths are much in need of reiteration. It is also true that the responsibility for the breaking of the rules usually falls more directly on the patient than on the physician, but in a great many cases the latter is not altogether blameless. His, however, are rather sins of omission.

Since we have had at our disposal more efficient remedies for the local treatment of gonorrhea there has sometimes been exhibited on the physician's part a tendency to rely exclusively on those agents and to forget, or at least, to underestimate the value of the old-fashioned hygienic rules.

I am very often asked: How do you treat gonorrhea? and I have always noticed that the practitioner who asks that question wants to hear all about the respective merits of protargol, argyrol, permanganate, and all the much advertised silver salts and santal oil derivatives, but that his interest in the hygienic part of the treatment is lagging; he either thinks that he knows all about it, which is quite possible, or that these rules are more of a tradition than anything else. Now, if such be his attitude here, there necessarily will be some reflection of it when he faces his patients; and we all know how the average patient chafes under the restraint of these hygienic rules, and what a willing ear he is always ready to lend to anything that might be construed by him, even wrongly, as tending to a possible relaxation of their stringency. This, I believe, goes far toward explaining why, while there has been considerable betterment in the remedies we have at our disposal for the therapy of gonorrhea, the treatment of the latter disease, as a whole, has not improved as much as it ought to have.

Thus the physician may fail to give to the patient proper instructions; oftener, he fails to lay enough stress on those instructions and on the necessity of heeding them; or, again, and this is his most frequent shortcoming, he fails sufficiently to emphasize the serious character of gonorrhea and to impress on the patient's mind the unsatisfactory nature of self treatment. As long as we allow the idea to prevail in the lay mind that gonorrhea can be treated by the patient himself, as long as it will be believed by the public that squirting into the canal, three times a day, in a more or less haphazard way, some black, brown, or purple solution, and swallowing after meals a dose of some nauseating mixture, represents the sum total of our best knowledge in gonorrhea therapy, so long shall we continue to see an unduly high number of cases of epididymitis that could have been prevented.

Therefore, let the physician insist, and insist strongly, not in a perfunctory manner, upon administering the local treatment himself. If he wins his point, it really matters little whether he selects irrigations or injections. As regards the production of epididymitis, there has been a good deal of bitter partisanship injected into the controversy between the advocates of both methods.

It has been the custom of the partisans of irrigations to charge that epididymitis is much more frequent after injections than after irrigations, and, if we take as a whole the results in cases in which patients inject themselves, it is true. Patients inject too much or too quickly, and the epididymis becomes swollen. But this is in nowise the condemnation of

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the injection method; it simply is that of the way it is applied when left to the patient's tender mercies.

Conversely, the defenders of injections accuse through irrigations of much mischief as regards epididymitis. True, irrigations pushed without the required gentleness, or given when they are contraindicated, as, for instance, in the case already referred to, when inflammation is violent in the posterior urethra, are liable to provoke epididymitis. Again, this is not the condemnation of the method, but simply of the way in which it may be misapplied. I have used both methods freely and, barring very few exceptions, have not caused epididymitis with either. Both are safe when properly employed; both are equally dangerous when incorrectly used. If there is any superiority at all in the irrigation method, as loudly claimed by the Janet school, it solely lies in the fact that irrigations are always given by the physician, while any patient thinks himself fully able to carry out an injection treatment.

Another detail of importance in the prevention of epididymitis is the wearing of a good suspensory. Here we have a concrete illustration of how those universally known rules are more honored in the breach than in the keeping. Every physician, every patient knows it, and, however, more than half of the patients referred to me by other physicians come without any suspensory at all; a majority of those who wear one have one that does not fit well; and practically none has ever been taught the correct way to put it on. A well fitted suspensory applies snugly on all sides of the scrotum and effectively lifts it upward, without causing pressure or chafing in any spot. If loose in any point, it must be padded with cotton. Patients must be taught first to fit the pouch around the testicles, then push the testicles forward, and, finally, to pass the penis through the hole provided for it. If left to their own initiative, they invariably follow the reverse order.

Acute gonorrheal epididymitis is a self-limited disease with a very marked tendency to spontaneous resolution. This means that it very seldom ends in the formation of an abscess of considerable size, never leads to atrophy of the testicle, and never threatens the life of the patient. But it does not necessarily mean that we ought in all cases to trust to natural hyperemia and phagocytosis to bring about the most satisfactory result that could be had, and that we simply have to wait for the spontaneous outcome without any active interference on our part, except to relieve pain.

In fact, there are some mild cases of epididymitis in which a purely expectant treatment, rest in bed with the testicles elevated and supported on a wide strip of adhesive plaster stretched between the thighs, is all that is required for a complete recovery with perfect anatomical restoration of the epididymis; but such cases are a minority. Generally it is necessary to assist natural hyperemia by the use of hot applications, which, besides, markedly relieve the violent pain, often to such an extent that we have to watch the hot applications very closely, lest a burn be produced without the patient becoming aware of it.

I might here remark incidentally that, since hyperemia is our sheet anchor in the treatment of acute epididymitis, the use of cold, or even ice cold, applications is absolutely unrational. Ice bags are, no doubt, efficient against pain, sometimes more than hot applications; but this advantage is more than offset by the slackening and stoppage of the natural defensive processes with subsequent slower and less perfect resolution.

The same may be said of the so-called ambulant treatment which enjoyed its hour of vogue a few years ago. The scrotum was painted with a sharp counterirritant, usually a 20 per cent. guaiacol solution in oil, the testicles were liberally padded with cotton, a large suspensory was applied, and the patient sent about to his work. The non-interruption of work was featured as a great advantage; it may have been one for reasons altogether irrelevant of good medical practice, but from the latter's standpoint it was indefensible. All cases of epididymitis treated without rest leave as a sequel large nodes; this I have verified time and again.

Node formation is, indeed, the usual outcome of expectant treatment, through organization of the exudate within and without the tubules. In time, spontaneously, or with the aid of elastic compression by a rubber bandage, the nodes may become smaller, but regression is always slow and incomplete. A node of large size usually shrinks to a certain extent, then persists indefinitely.

A node frequently blocks the lumen of the epididymal canal and renders the corresponding testicle sterile. That occlusion is not constant where

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there is a lump in the epididymis is undeniable; at the same time it is only fair to assume that most nodes of marked size probably cause obstruction. Therefore, recovery under expectant treatment often means incomplete resolution with a blocked canal and a sterile testicle, an evidently insufficient result.

To improve on it, we may either bolster up the natural defensive processes, or lessen the amount of work the latter have to do.

The first aim is attained by serum and vaccine therapy. Swinburne has been the foremost champion in this country of the serum treatment and speaks glowingly of its results. Owing to the analogies between the gonococcus and the meningococcus, antimeningococcic serum has also been resorted to, but I fail to see that there is any particular reason for this substitution, gonococcus serum being, as it is, more readily available than the other.

Autogenous vaccines are the only reliable, owing to the considerable number of known strains of gonococci and the possible existence of others. But, unfortunately, the time required for their preparation keeps them from being at hand at the onset when they would do most good. Doses of 2 c.c. of serum seem best at that time and give time to prepare an autogenous vaccine for later use.

It seems undeniable that vaccine therapy, on a whole, has a very beneficial influence on the course of epididymitis. But I think that the real action bears much more on the general manifestations of the acute period than on the local lesions. It is hard to understand why vaccine therapy, which so little influences the other local lesions of gonorrhea, in the urethra and prostate, should exhibit such an elective affinity on the local lesions of epididymitis as its partisans would have us believe. I consider vaccine and serum therapy as very valuable adjuvant, but nothing more; at best, it remains an indirect method of treatment.

The other and more direct way of securing a better anatomical restoration of the epididymitis is to decrease the amount of work phagocytosis has to do, and this brings up the question of direct surgical interference in epididymitis, by so-called epididymotomy. Epididymotomy was first performed by Bazet, of San Francisco, as far back as 1897; it has chiefly been advocated more recently by Hagner. Between Bazet's and Hagner's operations there is this very important difference that the former is a late operation, namely, the incision of an abscess that has already collected in the epididymis, while Hagner's procedure is early incision before any appreciable collection can be detected. The name epididymotomy is, perhaps, justified for the Bazet operation, but is a misnomer when applied to early incision in epididymitis. In so-called epididymotomy, as I have done it myself, and as I understand others do it, there is no incision into the substance of the epididymis, and there must not be any.

This is a point I want to make clear, as I find it is not generally understood by the general practitioner, and this misconception is the source of much unjustified opposition to the procedure. To the average physician, the word epididymotomy conveys the idea of incision into the epididymis; were this the case there would be no justification for the operation, and the latter would be defeating its own ends. The sole claim of superiority for operative interference is that it gives the best chances for anatomical restoration and patency of the epididymis tube. If now we should make an incision in the epididymis, we should certainly divide said tube in at least several places, and the only result of epididymotomy would be to replace a *possible* blocking by fibrous tissue by a *certain* occlusion by a scar. What we do is to incise the fibrous cover of the epididymis, then carefully raise the edges of the incision and strip the fibrous cover from the underlying epididymis proper. By so doing, we relieve the tension due to pressure of the inflamed tissue encased in an inextensible sheath, and we do away with the pain and the damage to the anatomical elements which are directly caused by such pressure; we also insure the escape and drainage of most of the periepididymal exudate, the organization of which would later produce sclerotic tissue. Thus we reduce to a minimum the amount of infected material phagocytosis has to dispose of; but we do not drain the real primary focus, which, of course, is within the epididymis tube. This might be the basis of a theoretical objection, but there is ample clinical proof that, given the relief of an incision in the fibrous coat of the epididymis, nature is perfectly able to do the rest.

During the past two years a large number of epididymotomies have been done in Professor Chetwood's service in Bellevue Hospital. I have

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personally operated there and elsewhere on about 30 cases, and I have been able to follow, in the Outpatient Department of the same hospital, the after results of a great many others, much more completely than is usually the case with that class of patients.

The technic is as follows: An incision, about half an inch long, is made over the swollen tail of the epididymis in a transverse direction, parallel with the bloodvessels of the scrotum. The incision is deepened slowly through the different layers, which are always edematous and blended together, so that they cannot be differentiated as in the normal condition. This fact makes caution necessary; very often I have announced that I certainly had reached the epididymis only to find out later that I had not yet gone through the vaginalis, or *vice versa*. The only constant landmark I have always found is fluid in the vaginalis.

When the fibrous coat of the epididymis is reached it is carefully incised; the flat, spatula-shaped end of a probe is inserted underneath it, and gently separates it from the epididymis up to the limits of the inflammatory swelling, if possible. This brings out sometimes pus, but almost always turbid serum. If any points of the epididymis bulge out and seem to fluctuate, we take a blunt probe and try to break the abscess cavity open, but such a focus is seldom found if the operation is performed within four or five days after the onset of the epididymitis. A strip of rubber dam is pushed between the fibrous cover and the epididymis proper as far as it will go, and left in place, for drainage purposes, twenty-four or forty-eight hours. No sutures are necessary.

This little operation, which is generally performed under general anesthesia, is very simple and absolutely devoid of danger. It only requires a little care to be sure that enough, and just enough, is done. We must avoid going too deep and cutting into the epididymis, and not going deep enough and failing to secure proper drainage and relief of tension. But, if this condition be met, the results are very gratifying; the pain disappears at once in all cases, and healing is complete, usually within a week, with a hardly visible scar. The nodes regress quite rapidly, and, in a great majority of the cases, vanish altogether. Naturally the results are all the more rapid and complete when the cases have been operated on near the onset. In older cases the discharge of pus lasts longer, but, even then, restoration of the epididymis to a perfectly normal condition is usually obtained. I have now under treatment a case in which epididymotomy was done two weeks after the onset, under apparently very unfavorable circumstances, and in which, however, the epididymis is absolutely normal to palpation.

That early incision gives the patient the best chance of not only recovering, but also being cured with a testicle unimpaired in its physiological capacity, seems to me to be beyond discussion. Among the cases I have operated on I simply want to quote one, because it affords a striking comparison between the operative and the non-operative treatment. The patient is one of those few in whom epididymitis seems very difficult to avoid. He applied first to the dispensary with a right epididymitis for which he was duly operated on. The first irrigation he received reduced a slight relapse which went down spontaneously. The next irrigation was given by myself, with the utmost gentleness, as the patient himself thought he could not have an irrigation without having epididymitis, an idea which I scouted. I was, therefore, very much mortified when he came back two days later with a fresh epididymitis on the till then sound side. He was readmitted to the ward, but, owing to some administrative complications, he could not be operated on. Actually, the right epididymis, that of the side operated on, is perfectly supple and normal; that of the left side, treated expectantly, is filled with a large, hard lump, and in all probability, blocked.

Consequently, I think that early incision is the treatment of choice in all cases of epididymitis where symptoms are sufficiently marked to leave the slightest doubt as to the possibility of complete resorption under less active methods of treatment, and the one we always ought to propose to the patient as best serving his interest. With vaccines and early incision, we can cure epididymitis; still, let us remember that the latter, to a great extent, is preventable, and that we really deserve more credit for warding off a case than for brilliantly curing several that might have been prevented.

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POSTHECTOMY.*

By HARRY L. READ, M.D., Louisville, Ky.

The term posthectomy is utilized in this dissertation to represent surgical extirpation of a portion of the preputial appendage of the genus homo masculinus, at any period of existence between the cradle and the grave. However, nothing contained herein should be so construed as to create the impression that the writer for a moment admits the premise that the so-called circumcision is ever applicable or justifiable in infant, adolescent or adult femininity under any circumstances or conditions, with the possible exception that it may occasionally be permissible in the attempted alleviation of that distressing physio-psychologic obliquity familiarly known and designated as hysteromania or nymphomania.

Posthectomy probably represents one of the most ancient minor surgical procedures of which there is any historical record. Contrary to the quite generally prevailing belief, however, there is ample evidence to indicate that the custom of excising a portion of the infantile prepuce did not originate with the Hebrews, nor does it appear likely that it ever constituted an essential part of their religion. The expression "circular cutting" (i. e., of the prepuce) is almost certainly not Jewish in origin. "The researches of Welcke led to the discovery of a true specimen of circumcision in the mummified person of Amen-enhab, who lived between the years of 1614 and 1555 B. C. The belief in the Jewish origin of the practice, however, has been even more hopelessly demolished by the discovery of the widespread custom of circumcision among the aborigines of the Australian continent and of the Malayan Archipelago."

The custom is said to have originated over six thousand years ago among the Egyptians, and was at a later period (date uncertain) adopted as a routine measure by the Hebrews and other races, the procedure in some instances being instituted during infancy, in others postponed until early adolescent life. The priests first gave it the stamp of religion, and it has so endured even since the climatic conditions which originally prompted it have markedly changed by the extensive migrations of the Egyptians, Jews and other races.

According to evidence afforded by investigation of ancient literature, the original reason for practicing posthectomy was as a prophylactic against infection from the so-called "Egyptian blood-fluke" (schistosoma hematobium), under the presumption that these parasites were so abundant in the waters of Egypt that in bathing they lodged beneath the prepuce, and infection of the individual thus ensued.

It is not intended that the scope of this address shall include consideration of the procedure known as "ritual circumcision." And while the writer wishes it understood that he does not favor "universal circumcision" about which much has been recently written by various authors, the interpolation of a few brief excerpts in relation thereto may be permissible.

Lydston thinks it strange that, with the experience and example of this great race (Jewish) before him, the Gentile has not generally adopted as a hygienic custom the operation of posthectomy; that according to the opinion of many eminent physicians, parents who do not have posthectomy performed upon their boys are almost criminally negligent, in which opinion he fully agrees.

Among the most ardent advocates of universal posthectomy is Wolbarst, who, in a recent paper, says: "At present, however, I am principally concerned with the operation of circumcision as a necessary sanitary measure. Not only am I heartily opposed to any curtailment of the practice of ritual circumcision, but I also advocate its universal employment in all male children, whether Jewish or Gentile, from a purely sanitary and health-giving point of view." Specifically stated his reasons for advocating universal posthectomy are:

(1) That it is a great aid to cleanliness of the genitals.

(2) That it is a decided prophylactic against infection with syphilis and chancroid.

(3) That it prevents in great measure the development of venereal warts, herpes, epithelioma and other growths.

(4) That it offers a diminished tendency to

* Portions of this paper were read before a meeting of the Jefferson County Medical Association of Louisville, Kentucky.

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masturbation, nocturnal pollutions, convulsions and other nervous results of local irritation.

(5) That it diminishes local complications in the presence of venereal disease.

(6) That it makes the "fourth venereal disease" impossible.

(7) That it prevents the development of phimosis and paraphimosis with their attendant complications.

There are unquestionably many instances in which the performance of posthectomy may be of distinct advantage to the individual, and obviously the operation should be invariably undertaken by someone thoroughly familiar with the anatomy and physiology of the parts, i. e., by a member of the medical profession.

Statistics show that various diseases of most serious import (tuberculosis, syphilis, smallpox, etc.) have been communicated by the careless and unwise in the execution of posthectomy upon both adults and infants; also that numerous accidents have occurred during the operation, e. g., (a) the excision of so much of the prepuce that inordinate traction upon the mucosa was later inevitable during erections, (b) the so-called frenal arteries have been divided resulting in dangerous primary and secondary hemorrhage, and (c) the distal extremity of the glans penis has been excised thus causing irremediable penile deformity.

Among the most prominent recognized indications for the performance of posthectomy upon infants may be mentioned the following:

(1) Where reflection of the prepuce is impossible because of extensive adhesion to the glans (phimosis).

(2) Where the prepuce is markedly redundant and its elongated portion unduly contracted (phimosis).

(3) Where the preputial orifice is abnormally located or so small as to markedly interfere with normal micturition.

(4) Purely as an hygienic or sanitary measure, thus preventing accumulation of smegma and insuring cleanliness.

(5) To reduce local irritation from retained secretions and thus prevent reflex nervous manifestations, convulsions, etc.

(6) To minimize the tendency to formation of the habit of manustupration, sexual excess and ultimate venereal disease.

In the adult and adolescent the following indications seem worthy of specific mention:

(1) As a prophylactic against phimosis, paraphimosis, balanitis, balano-posthitis, venereal warts, herpes, epithelioma.

(2) As a prophylactic against manustupration.

(3) Purely as an aid to genital cleanliness.

(4) To reduce the liability to syphilis, gonococcal infection and chancroid.

(5) Finally, but equally important, by preventing venereal disease in the male, to secure freedom from similar contagion in the female, statistics showing that a large percentage of pelvic operations upon women are made necessary by the contraction of venereal disease from the male.

While posthectomy has always been regarded as a simple procedure, a certain degree of operative skill is requisite to its proper performance. However, the writer does not consider it necessary that such patients (either infants or adults) should be referred to the general surgeon for attention. The operation may be safely and satisfactorily executed by any practitioner of medicine possessing the requisite anatomical knowledge and the essential operative skill.

In young children the parts are first thoroughly cleansed with soap and water, followed by a weak solution of lysol or bichloride of mercury. The employment of tincture of iodin is considered inadvisable in infants, because its application is likely to produce unnecessary irritation of the delicate structures. The penis is securely grasped with one hand; the prepuce is drawn forward the required distance and held in position by the blades of a pair of small scissors or small forceps so adjusted as to slant upward and backward. After being certain that the glans penis is not included the tissues are divided with a pair of straight-pointed scissors from below upward, the outer skin being thus removed and the edges retracted to the corona glandis. The mucous membrane is then divided from before backward to the corona, and by proper trimming (provided this be required) made considerably longer than the skin; the cut surfaces are then ready for application of the sutures. Any bleeding points are ligated with No. 00 catgut, and the same material

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is used for the sutures. The first suture is inserted at the frenum, then one at the dorsum, and another upon either side if necessary. In a certain percentage of cases in young infants, where there are no bleeding points to be ligated and the two cut surfaces are in proper apposition, no sutures will be required.

The wound is dressed with gauze to which has been applied one per cent. carbolized vaseline, or white vaseline and zinc oxide ointment, equal parts, with chloretone fifteen grains to the ounce. This ointment is placed over the center of the customary napkin applied. The nurse is instructed to apply a fresh dressing after each urination. Whenever there occurs any swelling or edema of the tissues, which is an exceedingly uncommon complication in infants, a wet dressing should be applied and changed at frequent intervals until these manifestations have subsided. A saturated solution of boric acid has been found to answer every purpose.

It is the practice of the writer to perform posthectomy upon infants when they are nine to ten days old, or so soon as the funis has separated and the wound has properly healed. Of course much will depend upon the physical condition of the child, and it is sometimes necessary to defer the operation until a later period. In infants under the age of three months no anesthetic will usually be required; but thereafter it has been the custom to employ a general anesthetic.

With respect to the operation in adults: After sterilizing the parts in the manner already described, a line is drawn around the prepuce with tincture of iodine at the point where the excision is to be made, and the tissues are divided in the center of this mark. It is advisable to place a soft rubber catheter or piece of gauze bandage firmly around the base of the penis, which acts as a tourniquet and also prevents absorption of the novocaine solution which is used as the local anesthetic.

Between the ages of three months and twelve to fourteen years it is advisable to administer a general anesthetic, and this also applies to nervous and excitable older patients; but the operation can usually be satisfactorily performed under local anesthesia, unless the patient is intractable. For this purpose a 2 per cent. solution of novocaine is advised, this being injected with an ordinary hypodermic syringe. First inject the skin along the line where the incision is to be made; then by inserting the needle between the mucous membrane and the skin, beginning near the frenum, inject the solution deeply toward the corona in a circle. In the adult from ½ to 1 dram of the novocaine solution is usually required to produce sufficient local anesthesia.

The prepuce is loosely clamped and excised in front of the clamp with straight-pointed scissors, beginning at the frenum and proceeding toward the dorsum, removing more of the skin from the region of the dorsum than the frenum. The skin is retracted to a point just posterior to the corona, and the mucous membrane is then slit to the corona, trimmed and left about one-fourth inch longer than the skin. This is an important step in the operation to prevent undue traction upon the mucosa after healing has occurred. In excising the prepuce in adults as well as in infants care must be exercised to avoid injury to the arteries, also not to remove too much of the integument, and to be certain that no damage is inflicted upon the glans penis.

All bleeding points should be carefully ligated with fine catgut, the tourniquet being gradually loosened, as it is essential that hemostasis be complete. For the suture material in adults No. 1 chromic catgut is employed. The first suture is inserted at the frenum, then one at the dorsum, and one upon each side, the suture ends being left three or four inches long to be utilized later in holding the dressing in position. As many other sutures as seem necessary may be introduced to secure proper approximation of the cut surfaces—of course the fewer the better.

The dressing consists of a piece of sterile gauze thoroughly impregnated with equal parts of boric acid and stearate of zinc, rolled to about the size of an ordinary fountain pen and placed over the suture line. The dressing is maintained in position by tying the suture ends which have been left sufficiently long for the purpose, first the one at the frenum, then the one upon each side, leaving the suture at the dorsum to be tied last. The gauze is trimmed the proper length at the dorsum before fastening the last suture.

If desired an ordinary light roller bandage

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may be placed over the dressing, to make it feel more comfortable to the patient. It is important that all sutures be not too tightly tied over the dressing, otherwise in the event erections occur the penis may be unduly constricted. Usually one dressing will be sufficient, it being left intact for seven to twelve days, by which time the wound will have healed.

The after care in adults is of little importance, especially as the dressing is not to be removed for about a week. It is advisable to furnish the patient with an ordinary glass test tube without bottom, and instruct him to urinate through this to avoid soiling the dressing. If a business man, the patient is able to continue his occupation without interruption; but a laboring man oftentimes has to lose two or three days from his work. He is instructed to report the following day, and as often thereafter as may seem necessary until the primary dressing is removed, by which time complete healing of the wound has generally occurred. However, a second light dressing is usually applied and left intact for another week, to protect the tender structures from irritation of the clothing, etc. The patient should be instructed to sleep in a cool room, with light bed covering, keeping the bowels well open with mild laxatives. In this way it is possible to minimize the tendency toward erections during the night. If necessary chloral and the bromides may be administered. In removing the dressing the sutures are simply divided, and after being soaked with sterile water or peroxide of hydrogen the gauze may be easily separated.

By following the technic and methods of dressing herein briefly outlined, in the performance of posthectomy upon both infants and adults, the writer has never encountered the slightest difficulty, and neither hemorrhage nor infection has ever occurred. Provided due precaution be exercised, there is certainly no excuse to be offered for injury to the glans penis during the operation, and with proper hemostasis and asepsis, neither hemorrhage nor infection should ever occur. It is sometimes difficult, especially in very young infants, to determine just how much of the prepuce should be excised, but for obvious reasons the removal of too little rather than too much is the wisest course to be pursued.

According to the method advocated by Thornton in the performance of posthectomy the prepuce is slit dorsally between two artery clamps; by passing a fine needle threaded with silk through the skin and around the superficial vessels, they may be lightly ligated near the line of incision. The ventral margin of the prepuce is grasped by a clamp; at intervals of about three-sixteenths of an inch No. 9 milliner's needles threaded with fine black silk are placed through mucosa and skin in a line around the penis, about one-fourth inch from the corona. The redundant prepuce is removed with scissors around the line marked by the needles. Each suture is then drawn through and tied. Since all the incised tissues are included, hemorrhage should be controlled when the sutures are tied, but if there be a bleeding point an additional suture may be inserted. The advantages claimed for this method are: (1) The line of incision in skin and mucosa is accurately marked and held in place by the needles, preventing unevenness and "loss of bearings"; (2) complete hemostasis; (3) prevention of retraction of subcutaneous tissues; (4) prevention of dead space and subsequent hematoma; (5) prevention of exposure of subcutaneous tissue to infection; (6) less traumatism and (7) less pain and priapism following operation.

In the opinion of Hessert one great difficulty attending the performance of posthectomy (especially to the novice) consists in the elasticity and sliding of one upon the other of the two folds of skin constituting the prepuce, that a miscalculation may result in the excision of too much or too little — first, of the skin, second, of the so-called mucosa. He has seen an operator "pull down" the prepuce, and after excising what was apparently the redundant portion, find to his utter amazement that there resulted a denuded zone above the glans around the shaft of the penis, while the real prepuce still remained in situ! On the other hand, too little skin may be removed resulting in subsequent contracture of the scar with recurrence of phimosis.

The following method of procedure is suggested by Edwards: With two catch forceps the prepuce is grasped anteriorly and posteriorly and

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drawn well downward; with the tissues "on the stretch" the skin is still further drawn downward with forceps, care being exercised to grasp only the skin. The straight phimosis clamp is placed upon the prepuce at a slight angle, having decided beforehand the amount necessary to be excised in order to expose the glans to the posterior third, the removed tissue being skin only. The author claims that when the clamp is removed and the skin retracted, there will be found a circle (skin) taken from the posterior third of the penis. The edges of the cut surfaces are drawn together and stitched with subcutaneous or interrupted sutures, the frenum being divided if necessary. The skin, if squarely cut and intimately approximated, will heal with but a faint line showing which will be "well back on the posterior portion of the penis," and the prepuce will possess the smoothness of nature. Hemorrhage is slight; no anesthetic is required excepting a few drops of cocain injected ahead of the clamp; the danger of infection is practically nil; incision made at the point described will not cause swelling of the tissues, and the dressings are much more easily kept applied.

Strong believes there is no surgical procedure which affords more satisfactory results than posthectomy, and it is his belief "that all boys in whom the prepuce does not remain back of the glans should be circumcised." In executing the procedure he thinks most operators employ too many stitches, that sutures are almost always unnecessary, that they not only add to the length and pain of the operation, but make the subject more prone to infection, and oftentimes leave ugly stitch scars. He avoids sutures entirely by the following method:

After excising the parts in the usual manner, the skin and mucous membrane can be made to satisfactorily adhere by applying several hemostats around the cut surfaces from before backward in such a manner as to grasp the mucous membrane and skin, with edges approximating, between the jaws of the hemostats for a third of an inch, and compressing the jaws tightly. The fenestrations of the blades compress the tissues in corrugated ridges and they will remain adherent. After a few minutes the hemostats are removed; no sloughing occurs at the point of compression. The usual circular dressing is applied, leaving the meatus free; this dressing is changed every twenty-four to thirty-six hours; healing is usually by first intention. In a small percentage of cases a bleeding vessel may have to be ligated, but compression generally controls the hemorrhage.

In dressing posthectomy wounds in infants Gessner simply makes a copious application of 2 per cent. carbolized vaseline, with a light wrapping of sterile gauze. At every change of the napkin the vaseline and gauze are renewed. In adults "a dressing that is just where it is needed and nowhere else, that makes the proper degree of pressure and no more," is applied in the following way: The sutures of catgut when tied are cut three inches long; a strip of gauze long enough to more than encircle the penis is rolled into a cord about one-half inch in diameter, and one end is tied between the two strands of any one suture; it is then placed between the two strands of the next suture which are likewise tied upon it; this is repeated until the end of the gauze roll is brought around to the initial suture between the strands of which it is also tied. Thus a gauze dressing is applied directly to the wound upon which more or less pressure is exerted according to the traction made upon it while tying the suture strands. It does not interfere with micturition nor does it become saturated with urine; removal is readily effected after three days by cutting the catgut knots and soaking the penis in a basin of warm water. A strip of zinc oxide adhesive makes a satisfactory collar at this stage. The author says this method of procedure is not original, being attributed, according to oral tradition, to Wyeth, of New York.

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Editorial Department

NEW YORK, MAY, 1915

RECTAL CONDITIONS FROM THE INTERNIST'S VIEWPOINT.

The internist, as a rule, either from the lack of a proper conception of their importance or a lack of interest, is prone to devote but little time to rectal conditions.

This has doubtless created the larger demand for a more careful knowledge of this branch of medicine, and for this reason a symposium on rectal conditions is most timely and should meet with a cordial reception on the part of the man in general medicine and surgery.

The patient is often diffident about examination and the physician may be glad to delay this ordeal until a more suitable time, with the result that unless in pain the patient may indefinitely postpone the correct diagnosis of his trouble.

A cursory external examination with a prescription for some astringent ointment—the remark that hemorrhoids are present, but doubtless will soon improve when the bowels are corrected; the careless examination of discharges without ascertaining their source and significance; and so one might go on, following the experience of many practitioners who are too busy to give the case the serious attention it deserves.

It is well to constantly bear in mind the anatomy and general blood supply of the rectum. The hemorrhoidal plexus is very profuse in its distribution, and nowhere in the body are the cumulative and insidious results so baneful as a retarding of the circulation in this area for any length of time. It is a unit with the portal system and may make the work of the liver light or easy. Direct infection of the liver is not unusual, and toxic absorption from gut stasis, with dilated sigmoid and the syndrome of auto-infection, is an everyday experience.

Unless the physician possesses more than ordinary skill and interest his observations are confined to digital examination and the probe, and yet the major portion of rectal conditions shows least by the above methods. Naturally a man who is not skilled in the use of the proctoscope is not going to take the chance of injuring a sensitive and tender gut—this field of examination belongs to the specialist—but the symptoms suggestive of rectal

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trouble are at times as badly understood and handled as the proctoscope itself.

A congested hemorrhoidal plexus, with chronic stasis and absorption, inevitably means mental depression, nervous irritation, and discomfort. The way a rectal case will improve after its correction is as much a source of satisfaction to the family as to the patient.

A probe is not always safe in exploratory work about the rectum—particularly in the hands of a novice; fortunately aniline dyes and peroxide have enabled us to follow with less danger the tortuous paths of a troublesome fistula.

Aside from the toxic mental irritation in most rectal conditions, patients often complain of indefinite abdominal dragging and pain, simulating uterine and ovarian disorders, and will frequently be operated upon for these and the fact entirely overlooked that a large chronically inflamed sigmoid, dragging upon the intestines, with a ptosis of the gut, is the real cause of their pain.

Sooner or later the chronic stasis in the sigmoid produces the ever present adhesion, and with the less active peristalsis the early accumulation and dilatation of the sigmoid begin.

Every specialist is gratified in finding in his patient some trait which doubtless is abnormal, but the greatest difficulty is experienced in giving a liberal and comprehensive interpretation to his findings. The patient's main troubles are symptoms—not a pathological variation of great interest to the student or specialist. The most helpful specialist is sometimes the man who can find nothing the matter with the patient from his point of view, and his negative findings become a very positive factor to the general practitioner.

It is wise and necessary that we acquaint ourselves with modern methods of rectal examination, but let us spare no means of finding out and becoming familiar with the systemic results which directly and indirectly are affected by rectal deficiency.

After all we are mainly concerned in accurate diagnosis, and every method or thought which contributes to this end is an addition to the protective and curative forces of medicine.

ORRIN S. WIGHTMAN, B.A., M.D.

RECTAL AND URETHRAL MINOR SURGERY.

In attempting to write an editorial on rectal and urethral minor surgery, I find myself confronted with a difficult task. However, I shall do the best I can.

In the first place I do not believe there is such a thing as minor surgery. I came to the conclusion years ago that all surgery is sufficiently serious and sufficiently important to be taken out of the category of minor affairs. An operation that involves but a small area, or that demands but a small incision, is often as serious or more serious than an operation of much larger extent. One of the greatest risks encountered in surgery is that of infection, and of course it is well known that the most dangerous infections are usually introduced into the system through very small injuries or solutions of continuity; so it is not the size of the organ involved, nor is it the extent of the operation to be performed, which determines the seriousness of a surgical procedure. Rather it is the spirit in which the subject is approached. In surgery, if one treat a case as of little importance, in other words, if one consider it to be one of minor surgery, and if one be thereby led to be slack in his methods, regarding any detail as of trivial significance, the case is prone to assume the most serious proportions, and it ceases to be minor surgery, but becomes surgery of the gravest nature, simply because due care and due attention have not been bestowed upon it.

Now a word as to the surgical specialties and the surgical specialist. They have all been alike in their evolution and they have all been on the wrong basis in the beginning. When gynecology became a branch of surgery, it was approached from the wrong direction, and it was espoused too often by the man who was untrained and incapable of properly performing his function. Just so it has been with proctology and the proctologist, and again with genito-urinary surgery as a specialty and with the genito-urinary surgeon as a specialist. He is too frequently not a surgeon at all. It is impossible to make a genito-urinary or a rectal surgeon out of a man who is not already a surgeon. The view one gets through an endoscope or a proctoscope is a narrow one. These instruments will aid the trained man to look in and to concentrate. They cannot aid, they can only confuse, the untrained man.

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A surgical specialist should first be a surgeon having all the fundamental groundwork of gradual and increasing experience in the broad domain of surgery, where he has learned surgical principles and facts, for it is the application of these to a special branch of surgery which makes the surgical specialist. There is no place in the domain of surgery where surgery is not essential.

In the early days, how often has one heard gynecologists (abdominal surgeons!) say that they did not know how to treat a felon, or a fractured finger, because, forsooth, they were not surgeons. Unfortunately their work demonstrated this very fact, and yet among them were untrained men doing a vast amount of most important surgery, having gradually crept from the vagina into the abdomen and from the abdomen to the breasts and finally into all branches of surgery. A structure that is built from its apex to its base is a poor one; it lacks foundation and strength and cannot endure.

Fortunately the times have changed. The surgical specialties are being taken up by men trained in surgery. Our country at large is benefiting by the fact. In every section and in almost every community there are men who are trained and qualified to practice surgery. The American College of Surgeons testifies to this fact, and it will do much in the future to develop and maintain a proper standard. It is a pity that it has classified itself as to specialties, for a man is not a surgical specialist unless he is a surgeon.

I feel that the above is all I care to write at present on the subject of urethral and rectal minor surgery. One cannot teach special surgery to one who is not a surgeon. Also there is no such thing as minor surgery.

PARKER SYMS, M.D., F.A.C.S.

Hypertrophic Sphincters.—Dr. G. S. Hanes (*Louisv. Mo. Jour. of Med. and Surg.*) says that it is not at all uncommon for patients to say that they have a sensation as though the rectum was "growing up." This is the result of contractions of hypertrophied anal muscles. Hypertrophy of the muscles is the result of this same type of chronic infection of the tissues which keeps a constant muscular contraction. Constipation, flatulency, indigestion, pain, etc., may all develop as secondary symptoms. The primary affection is in the anal structures and surrounding tissues which are in a low grade of inflammation.

Department of Railway Surgery

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MEETING OF SOUTHERN RAILWAY SURGEONS.

The forthcoming meeting of the Association of Surgeons of the Southern Railway, which is to take place at the New Battery Park Hotel, Asheville, N. C., June 2nd to 4th, inclusive, promises to be a notable event in the history of this society, both from a scientific and social standpoint.

As will be seen from the program published in last month's issue, the papers to be presented are of a most practical and instructive character and will no doubt elicit very interesting discussions. We are informed that other papers, titles of which reached the secretary too late for inclusion in the announcement, are of equal merit.

Conformably to a custom originated by the Official Organ of this Association two years ago, prizes will again be offered for the best papers read before this meeting. While last year three prizes were presented by THE INTERNATIONAL JOURNAL OF SURGERY, an additional one will be given this year, the awards to be made by a special committee appointed by the convention for this purpose.

The following prizes are to be donated for the four papers deemed of the greatest practical value by the Committee: First—An Allison Instrument Cabinet, manufactured by the W. D. Allison Company of Indianapolis, Ind. Second—A White Enamel Surgical Chair, manufactured by the Max Wocher & Son Company of Cincinnati, Ohio. Third—A complete Vaccine Outfit, comprising syringe, vaccines, in a neat leather case, manufactured by George H. Sherman, M.D., of Detroit, Mich. Fourth—A set of Hand Forged Surgical Knives, in a case, manufactured by the E. Schmid Company of Indianapolis, Ind.

It is hoped that the same interest will be manifest in this special feature as was evidenced at the 1914 meeting.

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TRAUMATIC NEURASTHENIA.*

By JOSEPH M. BURKE, M.D., Petersburg, Va.,
Chief Surgeon, Seaboard Air Line Railway.

The reasons impelling me to present to you this paper on "traumatic neurasthenia" is that long experience in my official capacity compels me, in justice to the railroad which I serve, to give you some facts by which you may be guided, and which will prove helpful to you in the differentiation of the true condition from the mythical fake cases.

The appalling frequency with which juries render large verdicts against railroads is abhorrent and abominable; in fact, their prejudices can not be removed by any testimony the company presents, and the conclusion must necessarily be, therefore, that they do not believe one iota of the evidence sworn to by any of the medical witnesses produced by a railroad. There are no doubt some exceptions to this general rule, and it may be that the verdicts against railroads could be condoned because of the impression made on juries by the glib tongue of a "shyster lawyer" or an "ambulance chaser," who will have the assistance of some unscrupulous member of the medical profession, who is either a fool or a knave, or, maybe, one who could, if he would, be an ornament to our ranks, but is shrewd and cunning and will swear on the stand without compromise, that psychical neurasthenia is a mental condition, that notwithstanding there is nothing objective, there is something *material* existing which is unexplainable, and at the same time will openly admit that the verdict of the jury as rendered will determine the amount of his fee. We can readily therefore put the blame of the prejudices existing among jurors on the educated and better class of people, as without their assistance and coaching, action in law would rarely be had.

It is true that the antipathy toward railroads was originially infused into the minds of the general public by the demagogic petty politician, who would proclaim that the wealth of railroads was in the hands of a few, and that this wealth would some day grind every man, woman and child into smithereens. Such statements were and are now believed by some persons, without their reasoning for one moment that but for the railroads we would be as barren as when Columbus discovered this great land of ours. Each and every one should gratefully recognize that our progress and civilization are indebted to that wealth which serves as so helpful an adjunct to our well being in every day life.

The railroads are daily paying out large sums of money to persons who get something for nothing, and this is due to the circumstances enumerated above. This condition in my opinion will continue, unless the U. S. Government intervenes through the Interstate Commerce Commission, and appoints an unbiased non-political commission of competent physicians to decide whether a person is injured or not.

Before entering into my subject I would especially emphasize that if you do not keep a record of your private work, as you should do, it is important to follow this plan with your railroad patients, for if litigation arises you have your record. This will always be of great help and benefit to yourself, as without it you may have to suffer humiliation, through your non-preparedness, at the hands of an opposing lawyer; therefore it is well to prepare in time of peace for any war that may occur. In such a record of our examination of a patient we should carry out the usual routine of ascertaining the name, age, occupation, the personal and family history, especially with reference to previous existence of any disease, and make a full statement as to the cause of the present condition.

A thorough physical examination should be made, going over the back, abdomen, legs and arms. If there is any complaint of soreness, determine whether it is increased by use of the part and whether it is fixed and localized. The pain is generally referred to the lower portion of the back, not to the back itself, but to its juncture with the pelvic bones. And be sure to notice if there is inability to lift either leg.

The subjective symptoms given by the patient himself, such as complaints of pain and inability to sit without support, should be critically examined. If the examiner will put the patient in the most trying position, that is, with palms of both hands straight up and holding between them any object, the effect observed will depend upon the muscular tone of the body. If there is stiffness of any of the muscles of the body, it will generally be more apt to show itself on the unaffected side,

* Read before meeting of Association of Seaboard Air Line Railway Surgeons, October 19, 20 and 21, 1914.

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but if we twist the arms and back, the stiffness will be completely relaxed.

This experiment shows a simple muscular contraction and not a fixed contraction as found in a neurosis or nervous disorder. If this examination is carefully made we can substantiate the subjective symptom of pain, and if so, there is usually hyperesthesia, while if pain is not present, there is no loss of function.

As to the examination by the pricking of pins, the patient, if a fake, will be non-committtal when you use simultaneously two pins over an area say of twelve inches.

The patella reflexes are of very little significance, but if we put the knee across the leg and tap quickly we will generally get an exaggeration. If, however, the patient has time to think and to control his muscles, there will be abolished reflexes. Notwithstanding this, a response in both the cremaster reflexes will occur in spite of himself, as he has no control over them. In general, reflexes, however, are of very little value, as the patient consciously or unconsciously, willingly or unwillingly, shows the difference.

In traumatic lumbago pain in the back occurs soon after an injury; it is not spontaneous; the muscles of the back are usually in a state of spasm.

Anesthesia of areas of the body is frequent in hysteria, but does not exist in traumatic neurasthenia.

The Mannkopff test is usually considered an adjunct, pressure being made upon the area alleged to be painful, and the pulse rate observed before and during the pressure. Excitability of the heart and rapid pulse, although objective signs, are not in themselves necessarily evidences of disease.

A most excellent sign and one which is stated to be pathognomonic of neurasthenia is asthenopia, which prevents long continued use of the eyes.

There is no pathology in "traumatic neurasthenia" or "railway spine," as there is no pathological lesion.

Pathologists have demonstrated that the spinal cord frequently retains its normal contour even after serious compression.

It is possible to have fracture of the vertebrae and tearing of ligaments without external evidences of injury; however, the x-ray will disclose the presence of any fracture or dislocation.

The two lines of thought in considering the pathology of traumatic neurasthenia are the Oppenheim theory and the general accepted opinion of the profession that it is a condition of the nervous system which produces a train of subjective symptoms. Occasionally there are other than subjective symptoms, but carrying out the theory of traumatic neurosis, you will have to have a train of symptoms of a certain defined type.

There is no such condition as "railroad spine," there is no pathology and hence the term is erroneous. Erichsen wrote on this subject in 1886 and published a book on "spinal concussion," and the term "railroad spine" which grew out of that book is now recognized as incorrect.

If a spinal neurosis is actually present and the patient has had one or more injuries preceding the last one, and notwithstanding he has been apparently well and able to engage in his occupation and in manual labor, it is impossible to say, owing to the complexity of the nervous system, whether the "neurasthenia" is due to the last or preceding injuries, even though this condition be present at the time of your examination.

Any physician can be fooled by subjective symptoms alone and some who are not try to fool others that a spinal neurasthenia exists.

Pain cannot be seen, nor can you tell if patient is exaggerating or is stating the truth as to the amount of suffering present, but your examination should enable you to express an opinion as to whether or not there is pain.

Persons working on trains are more subject owing to their duties to nervous conditions; railway postal clerks more frequently than others.

The vaso-motor disturbance known as "goose flesh" can be produced by undressing a patient in a cold room or by applying ice to any part of the skin. It can occur in health and disease and is of no significance.

Traumatic hysteria is where a person has either sustained an injury or imagines he has suffered one which weighs on his mind to the extent that he believes himself to be really injured. It can be of varying degrees, can last for several weeks, months or years, and even indefinitely. These persons are in perfect health, do not experience loss of flesh and are not troubled with insomnia; the appetite, digestion and general functions, and the pulse and temperature are normal. It is fortunate, however,

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for corporations, especially the railroads, that suits for traumatic hysteria are rare in men; when this condition exists it affects women, and my experience is that we will find from the beginning of puberty that hysteria results from dysmenorrhea or delayed menstruation.

In short, we must bring out and bear in mind that traumatic neurasthenia is commonly not an organic but a functional neurosis, and that the subjective symptoms may be verified by the expression of the face, the general condition of muscular activity, the pulse, the reflexes and other phenomena of the nervous system, but unless this verification is obtainable, we may conclude, though the juries decide by a verdict against you, that we have a fake case pure and simple.

In this most intricate subject I have tried to be as concise as possible, and if I have imparted any knowledge to aid you in guarding yourself and the company's interests and at the same time in helping you to be absolutely honest in your findings in any case coming under your care, I feel that my labor in the preparation of this paper has not been in vain.

FIRST AID TO THE INJURED: INSTRUCTION OF RAILROAD EMPLOYEES IN FIRST AID: ITS NECESSITY AND VALUE IN RAILROAD ACCIDENTS.*

By JACK HALTON, M.D., Sarasota, Fla.

Railroad employees should be instructed in the elements of first aid to the injured.

Railway coaches, freight cabooses and all stations should be supplied with first aid equipment and conductors, section bosses and station agents should be instructed in its use.

Certainly, no intelligent person will gainsay this assertion, be he physician or layman, but for the benefit of the traditional Missourian who has to "be shown" it may be well to give some attention to a subject that is distinctly and directly within our province as railroad surgeons.

The entire crew of every passenger train and every freight train, every section boss and every railroad employee is thoroughly instructed as to the proper procedure and their duty in case of accident. By word of mouth, by printed bulletin and general orders they have been taught how to proceed and what to do if the train jumps the track, falls through a bridge, collides with another train, or runs over somebody's fine imported Jersey cow.

Ask any qualified trainman what he would do in any particular kind of accident, and the chances are that not only will he tell you just what he would do, but he would also quote an order from headquarters as his authority. But, ask the same qualified trainman what he would do if a passenger should sever an artery on the broken window of a car, or a brakeman should have a leg or arm ground off under the wheels of his train, or the engineer or fireman should be badly burned or scalded, and you will find that apparently the trainman's official duties end when he has procured the names of witnesses to the accident and has had the injured one conveyed to the nearest company surgeon's office.

The names of these witnesses may be of use to the company's attorneys in defending the company's interests in the damage suit that is very likely to follow, or in clearing the company's trainmen from responsibility, but they are of precious little comfort or value to the unfortunate passenger or employee, who may bleed to death or be subjected to untold suffering through the absence of first aid properly and intelligently applied, or to the company's surgeon, who is called upon to treat a serious condition that has resulted from a minor injury—an injury which, had it been treated on the simplest of scientific first aid principles in the beginning, would have remained a minor case.

I do not hesitate to state that many surgeons now present have been called upon to treat severe lacerations or contusions of fingers, toes or other parts of the body, and have found them wrapped or bandaged with a filthy handkerchief, or a piece of a dirty, sweaty shirt or underwear, and the wound plastered with a gob of well-chewed tobacco, or black with dirty germ-laden cob-webs taken from some old car or shack, or even covered with a plaster of cow manure. And also, when the accident is more serious and a large vessel has been severed, we find the patient has been fed with whisky given by well-meaning persons with a false idea that it is the necessary stimulant in all accidents.

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with the inevitable result that the patient reaches the surgeon in a state of exsanguination and collapse, which might have been avoided were it not for the increased heart action and stimulation caused by the copious doses of whisky that had been administered.

We are all familiar with these evils and many more of their kindred that are directly due to the ignorance of train crews and to their lack of knowledge of the simplest elements of first aid methods and the absence of any equipment whatsoever with which to work.

It is here that I will relate some personal experiences that will, I think, give you my reasons for choosing first aid as my subject for this occasion.

Some time ago, I was on my way north, comfortably seated in the Pullman, when a trainman came to me with the request that I go forward to the front coach, as there had been an accident. I hurried to the coach and found the conductor blue in the face from exertion and efforts put forth by him in trying to arrest a hemorrhage from the wrist of a train newsboy, who had the misfortune, while opening a bottle of coca-cola, to have it explode, cutting his wrist very severely. A dirty handkerchief was tightly bound around the wound and a string neck-tie was tightly wound around the forearm about half-way between the elbow and wrist.

Numerous suggestions were offered by the passengers as to the best method to pursue, until the conductor announced with some show of authority, "I guess Doc knows what do to without any advice from you." This had its effect on all the passengers except one well-meaning old lady, who had torn a strip of reasonably clean muslin from some mysterious part of her make-up and informed me that if I would get a chew of tobacco or some wet snuff from somebody and paste it over the cut and wrap it with this muslin, the bleeding would stop without further trouble. There was nothing else on the train that could be used to bind up the wrist, so I accepted the kind old lady's muslin and bound the wrist tightly, discarding, however, the tobacco and snuff suggestion. The boy was put off at the next station and was given in charge of the agent, who, I suppose, directed him to the company's surgeon for further treatment.

Experience No. 2: A train leaving Jacksonville collided with an automobile, wrecking it completely. I was on the train and was called by the conductor to give what assistance I could. On reaching the scene of accident, I found that an old man and boy had been injured. The boy had been carried away to his home, which was not far from the scene of accident. I afterwards learned that he had received a fractured skull and was severely injured in the region of the chest. The old gentleman had received a compound comminuted fracture of the leg and was badly bruised and cut. By the time I reached him several of the train crew were attempting to lift him. The clothes about the broken limb were saturated with blood; the leg and foot were rotated inward. I immediately realized the seriousness of removal of the patient with the leg in that condition, so ordered the men to let him lie where he was, and asked the conductor to get me some bandages or something to make bandages of. He told me that there was nothing on the train that looked like a bandage, and on requesting him for a stretcher I received the same answer. I then asked someone to go to the Pullman car and get some clean towels or a sheet. After some time they returned and said that the Pullman porter and conductor would not let them have any, as they were held personally responsible for all linens and supplies and would have to pay for anything that was missing. Finally, someone did appear with an armful of towels. In the meantime, I had cut away the clothes from around the leg and found a compound comminuted fracture of the middle third of the tibia and fibula, with considerable laceration of the muscles in that region; considerable hemorrhage had already taken place.

I found some pieces of the bottom of the auto which I made into splints. With these and the towels I managed to bind and fasten the leg in a safe and comfortable position, and the man was lifted into the wagon and taken to the surgeon without further mishap.

It is easy to imagine what might have happened, and what probably would have happened in this case, had that patient been lifted to the wagon and jolted along the rough roads with the jagged ends of the fractured bones tearing and penetrating the already lacerated muscles and tissues in close proximity to the large bloodvessels.

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It is scenes and events like these that bring us to a true realization of our duty and responsibility as surgeons. These scenes impressed me very deeply at the time and have furnished material for much thought along the lines of first aid and instruction of those who are in a position to employ it to the advantage and benefit of the railroad, the patient and the surgeon. With the idea and determination to do all in my power to further the installation of first aid cabinets in trains and other suitable places, and the instruction of railroad men in their proper use, I have put the following questions to many of them and have received the following answers:

To a passenger conductor: "What would you do in case one of your crew was caught under the wheels of your train and had a foot cut off at the ankle?"

Answer: "Well, I would tie something very tight above the wound and wrap it up in something and get him to a doctor as soon as possible."

"Would you give him a drink of anything?"

"I would give him whisky if I could get it."

"Why would you do this?"

"Because I have always heard that whisky was good."

The foregoing answers are, I think, adequate to convince us of the lamentable ignorance of the general railroad employee regarding the proper procedure from a first aid standpoint in case of accident.

Here is a great opportunity for the railroad surgeon to exercise the art of prophylaxis.

From what I have learned from the many railroad employees that I have come in contact with and to whom I have mentioned the subject of first aid, I am convinced that they would all welcome and gratefully receive instruction in it; and if these men were lined up and instructed in this work, and every train supplied with a first aid cabinet, I would venture to say that it would not be long ere we would realize that this branch of the service would be of inestimable value to all concerned.

Of course, equipping each train, station and shanty with a first aid kit will involve some expense, but, outside of the one great benefit on the side of humanitarianism, comfort of passengers and employees, there are so many more offsetting advantages and the expense is so slight that we often wonder why this has not been done before.

The expense side we would leave to the practical minded gentleman whose business it is to take care of such matters. I know that the surgeons of the Seaboard Air Line are willing and ready to take up and commence a campaign of instruction amongst the railroad men in their different communities in first aid work, thereby preventing perhaps loss of life, limbs and much needless suffering, also lessening the amount of liabilities in damage suits, saving medical expenses, saving employees from forced absence from duty. Last but not least, from a railway and business standpoint, there is the valuable publicity which would accrue from the installation of first aid service on the Seaboard Air Line which would be another long step toward putting this road (in which we all have a great deal of pride and for which we are anxious to put forth our best efforts) in right with the public, thereby demonstrating that nothing is left undone by the management that would tend to the comfort, protection and safety of the passengers and employees.

President W. J. Harahan, in his address to the Seaboard Surgeons at Montgomery, Alabama, last year, stated that he had called the attention of our chief surgeon to the good that he felt every railroad surgeon could accomplish in the various communities in demonstrating to the public in a quiet, unostentatious way, that the railroads were doing all that was possible as far as public safety and comfort were concerned, that the respect, support and sympathy of the public were due to the railroad in greater measure than it then existed, and that above all things, *safety* comes first, not only in the road-bed and cars, but in the solicitude of the Company for the comfort and care of its patrons and employees.

I can assure our worthy President that the surgeons of the Seaboard Air Line are not "asleep at the switch," and that under the leadership of our chief surgeon, Dr. Joseph M. Burke, we stand shoulder to shoulder, ever ready and anxious to answer the call of duty and to exercise our most strenuous efforts for the betterment of conditions, the safety, health and comfort of all who may in any way come in contact with the great railroad system with which we have the honor of being identified as surgeons.

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MALINGERING.*

By J. F. Huey, M.D., Alton, Ala.

In presenting this subject, I feel that I owe this Association somewhat of an apology, inasmuch as one usually expects something of a scientific nature, and this, I fear, will be neither literary nor scientific.

It is not my purpose to go into detail as to the many conditions of injury that the malingerer may feign, but to sound a warning note that the railway surgeon may be constantly on the lookout for this ever increasing vice.

Malingering, or the feigning of injury or illness, is becoming more common every day, and I dare say that there is not a member of this body who has not had more or less experience with this kind of dishonesty.

In our industrial centers of Alabama—and I presume it is the same elsewhere—there is a growing tendency among all classes to bring claims or suits for damages against all corporations for real or imaginary personal injury. It has become so much so that in case of a railway or mine disaster, the "ambulance chaser," or solicitor for a certain class of lawyers, sometimes arrives on the scene before the surgeons, and is ever ready to offer advice to the injured.

I have in mind a case where an engineer was killed in a collision on one of our roads and his remains were shipped to his former home a couple of hundred miles away for interment, and on the family's return from the cemetery the widow was informed that a "gentleman" from Birmingham wished to see her. He was introduced and proved to be one of these "ambulance chasers," who had followed this heartbroken woman to the very gates of the tomb to assure her that his firm was ready to look after her interests, and to see that the railroad company did not beat her out of what were justly her dues.

It may appear to some that I am digressing or preaching from my text, but I merely mentioned these facts to show that those injured, or not, are given every opportunity to make out a case by the solicitor class of legal lights above referred to, and the surgeon should always make a most painstaking examination in every instance in order to be able to prove to the court, or jury, by a differential diagnosis, where fraud is to be expected.

The malingerer usually complains of his back or some portion of his anatomy that makes it difficult sometimes for the surgeon to prove that an imposition is not being practiced. It is a deplorable fact that we have members of the legal profession who will take these questionable cases, and so prompt and drill the subjects in the feigning of injury that they can sometimes deceive the very "elect."

I feel that I would fall short of my duty if I failed to pay my respects to a certain class of doctors, who from some fancied grievance against the railroad company or hope of pecuniary reward, are willing to assist the aforesaid shyster lawyer and his equally disreputable client.

There is another class of malingerer, who is equally, if not more, dangerous than the one with an injured spine, and that is the lady who claims that her fondest hopes in life have been blasted because she has miscarried as a result of injuries sustained while a passenger on a certain railway train.

I have in mind a case of this kind. A woman was on a train that collided with another, was shaken up some, but was able to walk a quarter of a mile to a street car. Four or five weeks later she claimed through her attorney that she had had a miscarriage caused by injuries sustained in this collision, and that it would require five thousand dollars of the railroad company's money to repair the damages.

She produced some evidence to corroborate her claim. The law agent of the company decided that he was up against a tough proposition, but before giving up entirely he decided to do some detective work. So he sent to an adjoining city and procured the services of a trained nurse, and succeeded in installing her as domestic in an adjoining house to the lady who had had the misfortune to lose a "future president," and in the course of a short time her efforts were crowned by the discovery and subsequent proof that this woman had undergone an operation two or three years previously for a complete hysterectomy.

Of course, had an examination been made, this fact would have been discovered at once, but there are many cases settled out of court, and, if not, every means is resorted to to prevent an examination.

As to the remedy, I would suggest that in all cases of injury, where possible, a very thorough examination be made at once, and the surgeon can

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usually tell, if he is a student of human nature, when the patient is inclined to magnify his injuries; and when he does, put the claim department next. While some contend that the doctor should not act in the dual capacity of surgeon and claim adjuster, I contend that whenever he has reason to believe a fraud is being practiced, it is his duty to his company to use every legitimate means at his command to circumvent it.

Surgical Gleanings

Pruritus Ani.—Dr. W. H. Kiger (*South. Calif. Pract.*, March, 1915) states that a local cause can be found in the vast majority of cases of pruritus ani. In one of his cases in which no local condition could be found after the most careful search, an examination of the stool disclosed amebæ, and the intense itching was relieved by hypodermic injections of emetine hydrochloride. It is interesting to note that no ulceration of the rectum or diarrhea was present. Probably the most common cause in the milder cases is lack of cleanliness. Hemorrhoids also frequently give rise to itching. According to Beach sinuses originating in an ulcer at the bottom of the crypts and burrowing beneath the mucous membrane, or emptying through some of the cracks or fissures between the folds of the skin, are the most frequent cause. While there is a large number of local factors, it must be remembered that the changes produced, especially in cases of long standing, may be attributable to the damage inflicted by the patient in scratching. Properly selected local applications, carefully followed up, will be successful in relieving the pruritus in the majority of the milder cases, but there is one rule that must be carried out in this treatment and that is absolute cleanliness. The successful management may be summarized as follows: 1. The recognition of the fact that the cause may be possibly constitutional, or reflex. 2. The discovery and removal of the cause by surgery or otherwise. 3. The proper hygienic measures instituted. 4. A protection of the parts from friction and irritation. 5. The proper local application according to the indication of the individual case.

Treatment of Chancroids.—Dr. M. Silverberg (*Pacific Med. Journal*, March, 1915) states that in the treatment of chancroids he avoids the use of cauterants or escharotics because his experience has shown that they cause extension of the ulcer. In his opinion, the two essentials are cleanliness and dryness. To secure the first he recommends frequent washing (every three or four hours) with a solution of mercury bichloride, 1 to 2,000. The sore is then thoroughly dried with a pledget of cotton and lightly dusted with some powder that is unirritating, that will absorb moisture without caking, and that will exert an astringent action. For this purpose he prefers iodoform in spite of its odor and the risk of dermatitis. It is employed in combination with equal parts of subgallate of bismuth, thoroughly mixed and finely pulverized. Ointments are to be avoided because they interfere with cleanliness. When the ulceration is progressive and is not arrested by this method, or when it is phagedenic, there seems to be nothing better than compresses of mercury bichloride, 1 to 2,000. For the treatment of bubo the author advises a 25 per cent. ointment of ichthyol when the gland is small and not attached to the skin and before there is any redness. Later when suppuration has occurred, the abscess is opened through a half-inch incision, and the cavity dressed daily with gauze thoroughly impregnated with phenol-camphor. If phimosis is present in a case of chancroid the swelling should be reduced as far as possible with cold compresses of aluminum acetate (1 to 5), and the preputial sac irrigated with bichloride solution, 1 to 2,000, dried with cotton applicators, and dusted with the iodoform-bismuth mixture. If the opening is too narrow for this treatment to be carried out, circumcision is preferred to dorsal splitting.

New Operation for Fistula in Ano.—Dr. S. J. Blumenthal (*Med. Record*, March 27, 1915) describes a new operation the advantages of which are said to be: (1) The sphincter ani is not cut; (2) no large raw surface to heal; (3) healing under clean conditions; (4) action of sphincter never impaired; (5) fistula practically sterile before collapse; (6) no scar on surface afterward; (7) knife not used at all; (8) bloodless operation; (9) operation of choice in young fistulæ. After the anal orifice has been dilated thoroughly, a probe is inserted to get the direction of the fistula, and the granulations removed from the wall of the canal with a small sharp curette. A straight sound is then passed into the fistula to serve as a guide in placing a series of chromic gut sutures which encircle the sound. The needle is kept always concentric with the sound and about one-half inch away from it. The first suture is the most important because it must close off the fistula from the rectum, the others follow two lines marked with iodin and parallel with the sound. After the fistula has been surrounded by a row of untied sutures the fistulous tract is anesthetized with 20 per cent. solution of cocain or novocain and cauterized with the Paquelin, applied through a small aluminum tube, so that only a small portion is cauterized at a time. There is now threaded onto the ends of the sutures a rectangular hard rubber plate, which conforms in shape with the nates overlying the course of the fistula and acts as a splint, compressing the entire tract and preventing the sutures from cutting the skin. After the orifice of the fistula in the rectum is closed, tincture of iodine is forced into the canal, allowed to remain a minute or two, and washed out with saline solution. A probe is inserted and the sutures tied. After this has been done a narrow drainage tube is passed up to the second suture.

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Original Articles

OPERATIVE TREATMENT OF HEAD INJURIES.*

By CHARLES H. FRAZIER, M.D., Philadelphia.

There is to-day, as there has been in years past, unnecessary confusion in the recognition of intracranial lesions which has arisen very largely, I believe, because of the confusion as to the interpretation of the terms "concussion" and "contusion." I am quite aware that literature contains volumes of classic essays dealing with the nature of concussion, and I would not for a moment venture into an academic discussion of the varying views which are entertained by eminent authorities. But with due respect for those who may disagree with me, I maintain that we should regard concussion as a lesion without any demonstrable injury to the cerebral structures, a lesion, therefore, in which the symptoms must of necessity be transitory in character, if not immediately fatal, and hence one which presents absolutely no indications for surgical intervention. If following an injury to the brain the symptoms persist beyond the period of immediate shock, let us regard the lesion as one of contusion, with or without gross hemorrhage, with or without fracture of the skull, as the case may be, but a lesion with the definite pathological picture which Dr. Müller has so well described.

I need not remind the members of this Association, whose experience in dealing with head injuries has been large and varied, that the serious forms of contusion are usually associated with a fracture of the base of the skull, often with a bursting fracture. The indications for treatment in these cases differ from those which present themselves in the depressed fractures of the vault, and resolve themselves into the problem of dealing with the condition of increased intracranial tension. The rapidly diffusing edema of the brain, which I regard as the chief and foremost lesion of cerebral contusion, soon causes such encroachment upon the vital centers of the medulla as to threaten their nutrition and vital existence. The question naturally arises: What can the surgeon do to ward off the impending death? And the invariable answer is temporal decompression. Perhaps the majority of you are in entire sympathy with this viewpoint, but let us analyze the situation before drawing too hasty conclusions.

An intelligent analysis of our cases would divide them into four groups:

(1) Those in which the injury is so slight that recovery is certain without operation.

(2) Those in which the damage to the brain has been so great that death is unavoidable in a short time. The fatal tendencies in these cases are easily recognized, and the patient survives the injury only a few hours. In this group, the temperature is often a valuable index of the gravity of the case. When the primary temperature is over 102 degrees, with the subsequent temperature above 105 degrees, recovery rarely ensues, and even when the temperature does not exceed 103, the fatalities will far exceed the recoveries. A rapidly rising temperature is always indicative of a serious central lesion.

(3) Those in which the condition, while serious, does not threaten life. There may be complete unconsciousness, even deep somnolence, the slow, full pulse, and the respiratory arhythmia of medullary pressure, and other concomitant symptoms. The complete clinical picture may not have reached its maximum intensity for twenty-four to forty-eight hours, then it remains stationary for an equal time and is followed by gradual restoration of consciousness and the subsidence of signs of pressure.

(4) In this group the patient survives the immediate period of shock; the symptoms of intracranial tension develop; and while the condition at first is

* Read before the third joint meeting of the Railway Surgeons' Associations, Pennsylvania Lines East and West of Pittsburgh, June 19 and 20, 1914.

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not desperate, it becomes progressively more serious, and there are signs of beginning breakdown of the respiratory and circulatory functions.

Certainly, in groups one and two (the very mild and the inevitably fatal), operative intervention is clearly not indicated. In group three, where there is a more prolonged stage of unconsciousness with delirium, there are some who say that decompression, while not of necessity a life-saving procedure, shortens the convalescence and minimizes the chances of serious sequelæ. While there may be some justification for this statement in the experience of others, it is not corroborated by my own observations; and, from what we know of the diffuse nature of the lesion in cerebral contusion, I do not understand how the establishment of a subtemporal opening could have any beneficent influence over the minute hemorrhages, lacerations and edema which characterize the lesion and which are more or less widespread. Subtemporal decompression will, I grant you, relieve pressure, though only to a limited degree, but it could hardly promote absorption of the hemorrhagic foci or prevent the damage of cicatrization that follows in the ordinary course of the process of repair.

In the final analysis, subtemporal decompression should be reserved for the last group, where there is danger that the increasing tension will overwhelm the vital centers, and in this group will be found but a small percentage of the total number of cases.

The difficulty in determining the benefit to be derived from temporal decompression arises from the fact that there is such an extraordinary variation in the percentage of recoveries or fatalities reported from different sources. In my own series, the percentage of recoveries in basal fractures was 65; of the fatalities, one-half died despite the operation, and the remaining number without operation. Hartley has said that the mortality of fractures of the base by the expectant plan of treatment is as high as 90 per cent., and from 27 to 33 per cent. by the operative treatment. He recommends the operation to prevent meningeal adhesions, gliosis of the cortex with late traumatic neuroses which ensue, as well as in the more severe cases. In 614 cases reported by Babler (*Journal of Missouri State Medical Association*, May, 1911) there were 289 fractures of the base; of the 65 cases operated upon, 45 died—a mortality of 69 per cent.; of the 224 cases not operated upon, 128 died—a mortality of 57 per cent. In reviewing a series of 190 cases of fracture of the base, Ransohoff (*Annals of Surgery*, June, 1910) found a general mortality of only 65 per cent. The interesting features of Ransohoff's statistics are these: that 37 per cent. of the fatal cases died within six hours, 56 per cent. within twelve hours, and only 15 per cent. after the second day. This is the group, I believe, in which we will find those cases which are suitable for operation. Ransohoff expresses his views as to the propriety of operation somewhat as follows: In the cases which die within the second day, the coma is not very profound nor the breathing stertorous. In these cases in which the pulse is slow and full, and a lumbar puncture returns blood-stained fluid and shows an increase in tension, trephining is indicated. Where it is not possible to trephine, repeated lumbar punctures may take the place of a decompressive operation. In a large group of cases in which the symptoms are not indicative of any severe injury, 80 per cent. usually recover without operation, and, unless there is some indication of increased pressure, an operation should not be undertaken. In those cases which at first do not appear to be very severe, but which grow progressively or suddenly worse, a decompressive operation is indicated and may be the means of saving many of them.

Lumbar Puncture. In this connection we might allude for a moment to the advisability of performing lumbar puncture both as a diagnostic and therapeutic agency. We have already referred to the degree of increased intracranial tension that is such an important factor in the pathology, symptomatology, and treatment of intracranial trauma. Although I do not believe in a decompressive operation, I am heartily in accord with the suggestion that lumbar puncture be practiced as a therapeutic measure in all cases of cerebral trauma for the relief of tension. I have in mind the report of a series of 36 cases in which this measure was resorted to as a routine procedure, of which total number only 4 succumbed. Ten of these 36 cases were fractures of the base, 5 fractures of the vault, 18 cerebral contusions, and 3 concussions. Lumbar puncture undoubtedly relieves tension, and with it the evidence of pressure on the medullary centers. I should, however, not recommend this as a routine procedure unless precaution were taken not to allow the intraspinal pressure to fall below the normal. The possibility in cases of extreme intracranial ten-

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sion of the medulla being engaged in the foramen magnum by the withdrawal of fluid from the dural sac has been exemplified and emphasized in connection with intracranial tumors.

There is, however, a very clear indication for a resort to lumbar puncture in cases of intracranial trauma, especially those in which there is some doubt as to the extent or the gravity of the lesion, and cases in which there may develop at some time medico-legal complications. I have frequently practiced lumbar puncture in such cases and regard it as a very important positive finding when blood-stained cerebrospinal fluid is recovered. This, to my mind, is positively indicative of an injury of the meninges or brain, which of course could not be simulated, and therefore eliminates the question of malingering. One can also measure the degree of intraspinal pressure after the needle has been introduced, and in that way secure an added bit of information which may be helpful in suggesting the form of treatment.

Fracture of the Vault. Fracture of the vault of the skull may be fissured, depressed and often compressed. In every lacerated wound of the scalp attending a serious blow upon the head, the scalp should be shaved about the wound, the tissues thoroughly disinfected with iodine, and the surface of the skull carefully inspected for fracture. I do not believe these fractures should be explored unless the roentgengram shows a fracture of the internal table with some displacement.

There is no doubt whatsoever that *depressed* fragments should be elevated, but in this connection permit me to protest against a very common practice of throwing away these fragments. This, it seems, is almost a universal practice, and is to be condemned as a bit of meddlesome and harmful surgery. There is evidence at hand to show that epilepsy is more apt to follow cases of intracranial trauma with a permanent cranial defect than without it. It would take me too far afield to go into a lengthy discussion on this topic, but I am quite convinced that the principle involved is a sound one and should not be ignored. If, in the elevation of fragments, the latter become altogether detached, or if they were detached on first inspection, they should be thoroughly cleansed in warm saline solution, broken up in smaller fragments and immediately reimplanted; and, unless the wound becomes infected, the grafted fragments will heal in kindly, as they do in 80 per cent. of the cases, and the defect will be repaired.

I have spoken on this topic somewhat at length and with emphasis because I have so often been called to repair defects at longer or shorter intervals after the accident which could have been repaired at the time of its occurrence, and the patient thus spared an additional operation and, in some instances, the development of traumatic epilepsy.

Should the dura be opened in all cases in which it has been explored? The answer to this question will depend upon circumstances. I should say yes, but only when there is evidence of extreme tension as revealed by palpation or absence of pulsation, and when the bluish discoloration indicates the presence of a subdural clot. An exploratory dural incision as a routine procedure is not to be countenanced.

There are many reasons why a very complete examination should be made of the patient soon after the accident, not only because of the possible value of such notes if the case is brought to the courts, but because of their usefulness as a basis from which to draw conclusions as to whether the patient's condition is improving or growing worse. One can secure a great deal of information even with the unconscious patient if the habit is adopted of making routine examinations, beginning always with the cranial nerves and passing from them to the disturbance of the reflexes and of the sensori-motor apparatus. I can recall a case in which, had it not been for the systematic investigation of the function of the cranial nerves and the fact that we discovered a loss in the sense of smell, there would have been no evidence of a serious injury. In all other respects, so far as focal symptoms were concerned, the evidence of a serious intracranial injury was negative. The condition of the pupils and the movements of the orbit, the disturbance of sensation which one finds sometimes from injury to the fifth nerve, the slight drooping, particularly at the angle of the mouth, suggesting facial palsy, are among the more common symptoms attributed to involvement of the cranial nerves. In the extremities, we may find exaggerated reflexes or their total abolition, complete flaccid paralysis or resistance offered to passive motion. I will not enumerate symptoms with which you are all familiar, but I

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merely want to emphasize the importance of a careful record being made as soon after the accident as possible. I have frequently been called in consultation to give an opinion as to the advisability of an operation, and have found either no record at all, or only a very incomplete one, of what had transpired before my visit. The absence of reliable records makes the consultant's work very much more difficult.

There is a condition as described by Vorschutz (see *Progressive Medicine,* page 21, 1909), the significance of which is, I believe, not usually appreciated. Immediately after a serious accident one finds areas or zones of hyperesthesia, which, if present, should be accurately mapped out at the time of the injury. As a means of determining the presence or absence of a grave lesion, the finding of these hyperesthetic zones is of considerable importance in the absence of other signs, and it not infrequently happens that they persist for a number of years.

Another observation which I have made from my experience as a consultant is the infrequency with which the surgeon or attending physician takes advantage of the information which may be derived from an examination of the eyegrounds. This offers occasionally an important clew as to the existence of intracranial tension, and while I have not observed in any large percentage of cases an actual papilledema, which some other observers have regarded as a more or less constant factor, I have found in a larger number at least some tortuosity and fullness of the retinal veins. This is, to my mind, just as important a clinical fact as if the change in the eyegrounds had advanced to a later stage and a well developed papilledema was demonstrable.

We are told that coincident with the increase of intracranial tension and the subsequent compression of the medullary centers there develops a rise in blood-pressure to compensate for the circulatory difficulties. In my clinic at the University Hospital, almost uniformly observations on the blood-pressure are made at the time of the first examination, and often we repeat them; but while there are some very marked exceptions, as a rule, we have not been able to find that the blood-pressure has been disturbed with anything like the regularity that we would have expected from the other evidence of serious intracranial compression.

Intracranial Hemorrhage. I know of no more puzzling problem in intracranial injuries than the recognition of hemorrhage and the determination as to whether it is unilateral or bilateral. The difficulty in diagnosis arises often from the fact that there is a multiplicity of lesions. In some cases, there is a co-existent epidural and subdural hemorrhage, and superimposed upon this, a general contusion. Under such circumstances, the classical picture of an epidural or subdural hemorrhage, as described in the text-books, will not be observed. Leaving contusion out of consideration, the symptoms of extra- and sub-dural hemorrhage are often similar and not distinguishable from each other. As Phelps has said, a hemorrhage is a hemorrhage wherever it is situated, and its location can only be indirectly established, if at all, whether it be pial, epidural, or cortical.

Of the exceptions to the general rule, it should be noted that there are many cases in which there has been no interval of consciousness, other cases in which there is no uniformity in the ocular phenomena. The so-called Hutchinson's pupil may occur in cerebral lesions other than hemorrhage, and is not always indicative of a hemorrhage in the middle fossa of the same side as that of the dilated pupil. Of the motor phenomena, hemiplegia, partial or complete, is not always preceded by a period of convulsions, and more confusing still is the presence of a contralateral hemiplegia. Thus it will be seen that there are so many exceptions to general rules that the diagnosis of intracranial hemorrhage and the localization of the clot must be based upon the general rule of averages, in the absence of any very definite localizing symptoms. A point of some value in differential diagnosis is the degree of febrile reaction. In the case of hemorrhage without serious injury to the brain centers, the temperature remains stationary or but one or two degrees above normal, whereas in serious central injury, there is a higher elevation, which constantly increases within a few hours of the injury. We should never be led astray by the site of the injury to the scalp, but should be guided chiefly by such focal symptoms as may be elicited by careful examination.

The treatment of hemorrhage, whether dural or epidural, is of course operative. So delicate and so sensitive are the cells of the cortex that the sooner the blood clot is removed, the better will be the prognosis. The only point which might properly be

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brought up for discussion in the operative technic is whether exploration should be made by an osteoplastic resection of the skull or through a trephine opening, later to be enlarged as the case may require. Inasmuch as we are now able, with almost uniform success, to repair defects by immediate reimplantation of the fragments of bone removed, I am inclined to believe that as a general practice we should dispense with the osteoplastic flap in the exploration of cerebral hemorrhages, more particularly when there is some doubt as to the site of the hemorrhage. An opening made with trephine or Hudson drill, later enlarged when necessary, will expose a large enough area to determine whether there has been a hemorrhage in the suspected region. The chances of the patient's recovery will be greater than if we attempted a more formidable procedure. Another word of caution with reference to the surgical treatment of hemorrhage is the importance of appropriate hemostatic measures in order to preclude the possibility of recurrent bleeding. There are various ways of dealing with this problem with which you are all familiar, but the possibility of recurrent bleeding after the patient has reacted from the shock incident to the injury, especially after the pressure has been withdrawn by the removal of the clot, should be borne in mind.

Trauma of the Venous Sinuses of the Brain. Trauma of the venous sinuses of the brain, both with and without fracture, is comparatively rare, since they have a very firm bony covering and are closely atached to the bones of the cranium. Indeed it is only very exceptionally that an injury is inflicted upon one of the venous sinuses without an accompanying fracture, since the cavernous sinus is the only one open to direct violence without a fracture, and this is the sinus which is most rarely injured. Wharton (*Annals of Surgery*, 1901, Vol. xxxiv, p. 81), in his collection of 70 cases, found the superior longitudinal sinus injured in 40 cases, the lateral in 25, the cavernous in 3, and the straight sinus in one case. In this series of cases there were 45 deaths, a mortality of 64.3 per cent. Hence, we see that injury of the venous sinuses should be considered as a very grave form of intracranial trauma, the chief sources of danger being hemorrhage, external or intracranial, and infection. The latter is especially prone to occur unless the greatest care is taken to maintain asepsis. Hemorrhage is best controlled by aseptic gauze packing, except in cases in which the wound in the sinus is small, when a lateral ligature may be applied, or in certain selected cases the wound may be closed by suture.

Late Effects of Intracranial Trauma. Among the late effects of intracranial trauma, one naturally considers the question of traumatic insanity. Dr. Cotton has told us that we must recognize two forms of traumatic insanity. There are cases in which the physical injury was slight and the mental shock great—cases in which the trauma has caused no gross lesion, but a definite, distinct psychosis has been constructed in a patient already of a neurasthenic temperament. In this group of cases, operation is not to be thought of. When, however, insanity develops soon after a head injury and the site of the trauma can be detected by some localizing symptoms, such as tenderness, headache, depressed fragments, etc., operation should be undertaken without any doubt. DaCosta has well said one should not operate on a case simply because there is a dubious record of an antecedent fall or blow, which merely suggests the possibility of a traumatic origin for the insanity. The effect of exploratory operations upon traumatic psychoses, however, is very striking in some cases. This is true not only of those in which some demonstrable lesion is found, but also of those in which the findings have been negative. Several years ago I operated upon a young man who had been struck on the head with a baseball bat and had been unconscious for two weeks. Upon recovering consciousness he was found to be hemiplegic and to have some disturbance of sensation on the affected side and defective memory. The latter condition persisted for several months, at which time I recommended an exploratory craniotomy. Absolutely nothing was found at the operation to account for the symptoms, but the effects of the operation were most gratifying in that the patient within a week was able to move the affected arm as freely as the other, and recovered his memory for events happening since the accident occurred.

Repair of Defects Following Trauma. It is not altogether out of place in discussing the late effect of intracranial trauma to refer for a moment to the technic for the repair of defects of the skull and dura. In my clinic at the University Hospital we have had a great many cases of traumatic epilepsy referred to us for operation. In many of these there is a cranial defect of considerable dimensions, and

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we have invariably recommended the repair of the defect as a means, in some instances, of breaking the epileptic habit. Of the various methods devised, we have most frequently resorted, and with absolute satisfaction, to the König-Müller method, which consists in removing a section of the outer table from another region of the skull sufficiently large to cover the defect. I am impressed, however, with the suggestion which has recently been made that a fragment of the blade of the scapula be used for this purpose, and because of the greater simplicity by which the graft may be repaired, I will in the future give preference to this suggestion. Occasionally cases will arise in which it may be necessary to repair dural defects, and for this purpose one may use either a transplant from the fascia lata or a layer of fatty tissue. While it may be necessary to remove the dura because of adhesions or for other reasons, I have not always felt obliged to replace it if the defect in the skull was to be repaired. The dura is a protective membrane and supplementary, as it were, to the skull, and its presence is not at all essential.

Resumé. In this cursory discussion of intracranial trauma, I find that little has been said of the operative technic. This is of secondary importance, as after all the greatest responsibility which the surgeon incurs in the management of these cases is the determination whether to operate at all and, if so, when. The various steps in the technic in operations for cerebral injuries do not differ materially from those in operations for other intracranial lesions. As a prophylactic measure, urotropin is administered in large doses—gr. xx, three times a day, for a period of five or six days; an anesthetic is dispensed with if the patient is unconscious; the skull is opened with a Hudson drill, and the opening enlarged, as indications dictate, with a larger drill or with the rongeur; the subsequent steps of exploration depend upon the findings and have already been emphasized.

A word as to the after treatment and prognosis, and I am through. Always give a guarded prognosis to the members of the family. No matter how bright the chances of immediate recovery, the incidence of serious sequelæ is not small, and the various forms of psychoses, the traumatic neurasthenias and hysterias, and, most frequent of all, traumatic epilepsies, must be reckoned with in forecasting the future. Sometimes a seemingly trivial injury will be sufficient to turn the balance of the unstable mind.

Upon all occasions insist upon a prolonged period of rest, both physical and mental, the laborer from his toil and the business man from his desk. Complete restoration of function after injuries to the central nervous system is not to be expected in weeks, but only after months of freedom from fatigue, care, and responsibilities. While complications cannot be altogether averted, they will at least be minimized by the proper supervision of the patient during the convalescent period.

ANCIENT FRACTURES.*

By STEWART L. MCCURDY, A.M., M.D.,
Pittsburgh, Pa.

What general practitioner, if he could, would not pass all the fractures that come to him for treatment on to the next fellow? Injuries of the bones constitute a group of the most obscure conditions which medical men are called upon to treat, and are the basis of ninety per cent. of all the suits for malpractice against physicians and the suits of patients against corporations for damages. For this reason they represent a most undesirable class of cases. Without unduly criticising the doctor who sees an average number of fractures during the year, I venture to make the statement that the treatment usually carried out is an effort to adjust the displacement, and after an estimate has been made as to shortening, angular displacement, etc., the application of a splint with the prayer that the bone will unite and that the patient will have a functionally useful extremity.

The title of this paper presupposes that the first attention fell far short of restoring the fractured bone to a normal position at the time of the accident. There are several conditions, any one of which may be accountable for this failure. The most frequent cause is failure to reduce the fragments after manipulation in simple fractures in deep tissues, as in the thigh. The second cause is the interposition of soft tissues between the ends of the bones. A third cause is too tight bandaging, making such pressure as to interfere with nutrition of the bones. Another condition is failure on the

* Read before the third joint meeting of the Railway Surgeons' Associations, Pennsylvania Lines East and West of Pittsburgh, June 19 and 20, 1914.

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part of the patient to acquiesce with the surgeon in carrying out the treatment, frequently removing the splints in the absence of the surgeon. The fifth reason why bones do not unite is on account of blood conditions, such as syphilis, tuberculosis, etc., where sufficient reparative material is not thrown out about the ends of the bones to produce union, even when they are placed in the proper position.

In classifying conditions which are sequelæ to remote associative factors of fracture, it is best to consider them as follows: First, as delayed union, when the bones fail to unite in the usual six weeks, but when union occurs in the course of three or four months without operation; second, non-union, a condition of false joint at the point of fracture, where the ends of the bones, instead of throwing out reparative material across the chasm, simply repair themselves, leaving cicatricial tissue between the bones rather than ossification; third, deformities following fractures which have united. In this condition a correction can be made by removing a cuneiform section of bone, or, as occurs in fractures of the radius, by refracture or correction of the deformity.

Since the x-ray has been introduced, it is possible for the physician who has access to it to make a proper diagnosis and give the case correct treatment from the beginning. Physicians who have not this advantage must do the best that is possible under the circumstances to restore the bones by manipulation and traction and hope for union.

In operative treatment for bones which have been out of position for weeks or months, the first step, after making an incision into the area of fracture and freely exposing the bones, is to return the ends to a normal position. This is a most difficult task in many instances, and requires considerable labor on the part of the surgeon, but in no case in the writer's hands has it been impossible to secure such a result. A method usually practiced is to free the ends of the bone of entangling tissues, care being taken not to strip them of periosteum and soft tissues more than is absolutely necessary, and then return the bone to proper position by the use of a large Macewen chisel or elevator made especially for this purpose, placed upon the ends of the bone. An assistant should grasp the extremity and gradually make such traction as is possible. During the traction by the assistant, the surgeon by the use of the chisel will be able to lengthen the muscles and tear loose the adherent tissues about the point of fracture, and after considerable labor will eventually jump the bone into place.

The second step in the operation is to secure the bone in this position so that it will remain so after the wound has been closed, and until union has taken place. Several methods have been suggested to accomplish this purpose. The writer has been using iron wire for about eighteen years. The number of wire best adapted for the bones of the extremities is either 18 or 20, which comes on spools and may be purchased in any hardware store for ten cents. One advantage in the use of iron over silver wire is that iron has tensile strength many times greater than silver and is less likely to be broken. Again, iron is a normal constituent of the blood and the wire never becomes a foreign body, but will remain in the tissues for years without causing any trouble, as has been demonstrated in a great number of cases; while silver is not a normal constituent of the blood and a great many of the silver wires which are placed in the tissues are removed later because they establish a sinus which will remain until the wire is removed. It may be necessary to tilt the bones a little while drilling and introducing the wires.

The advantage in leaving the bones down in the tissues is to preserve the nutrition and thus guarantee union without exfoliation. One could not expect union to take place if the bones are pushed out through a wound and stripped of all periosteum and soft tissues from one to three inches from the ends. It is rarely necessary to drill entirely through a bone, but only through the surface into the medullary canal. Two such wires may be placed about one-third of the circumference apart, if necessary, through a very moderately sized incision over the fracture, and this will be all that is necessary to hold the bone in position, regardless of its size.

As to bone plates, such as were introduced by W. Arbuthnot Lane about three years ago, the writer was always prepared and had intended to resort to them when opportunity presented itself, but in no case was it found that the bone plates would serve a better purpose than the ordinary iron wire, and therefore they have never been used. A surgeon of Cook County Hospital (Chicago) made the statement that ninety per cent. of all bone plates

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employed in fractures in that hospital required removal at a subsequent operation. The surgeons who did use them when they were first introduced have practically discontinued them, with the exception of a few enthusiasts. Iron wire never requires removal. An inquiry made at the instrument houses where bone plates are sold furnished the information that while a year or more ago they were in great demand, now they are called for very infrequently.

Fig. 1 represents a fracture of the clavicle which, in A, shows an overlapping of an inch. It was decided to wire and the result is shown. Complete union occurred without complications. The clavicle is slightly prominent on account of the extensive laceration of the tissues at the point of fracture, due to the fact that the shoulder was forced forward and inward overlapping the bones, thus lacer-

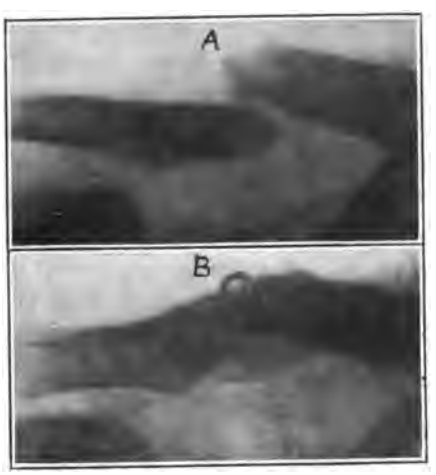


Fig. 1.

ating the tissues greatly. When the bones were pried in position and wired the shoulder did not assume as perfect a position as it should, resulting in a slight kinking up at the point of fracture. This in no way interferes with functional usefulness of the extremity.

Fig. 2. Dr. M. F. D. was thrown from an automobile, which resulted in fracture of the anatomical neck of the humerus. Complete separation of the head with dislocation of the fragment from the joint, turned with the articulated surface downward, the fractured surface resting against the under surface of the acromion process as shown in Fig 2. Incision into the fracture was advised with a view of reducing the head of the bone into its normal position if possible, or with the alternative of removing the head. The head was found entirely out of the joint cavity and the capsule pushed inward and below the fragment. There was considerable union already established between the acromion process and the fragment as reversed, and no union between the fragment and the shaft. The head of the bone was removed and ankylosis broken up from time to time, resulting in quite a useful joint. Patient is a dentist and has practiced continuously at his profession during the past three years.



Fig. 2.

Fig 3 shows a fracture of the humerus just above the elbow with a T fracture into the joint. Case was seen a week after the accident. An open operation was performed, making an incision along the

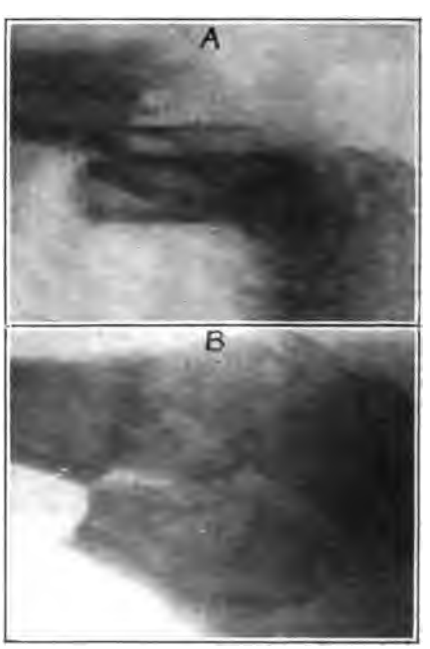


Fig. 3.

external supra-condylar arch. A Buck's extension was applied for about a month, and repair was prompt without complications. Two anesthetics have been given since the operation to break up adhesions, and the boy is now able to extend the

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arm completely and to fasten his collar in the back with a perfectly useful arm. Fig. 4, showing the arm in extension and flexion, is evidence that functional usefulness is practically perfect.



Fig. 4.

Regarding the treatment of elbow-joint fractures I want to state that since the recommendation of Dr. Oscar H. Allis, of Philadelphia, about 30 years ago, I have treated all these cases in complete ex-

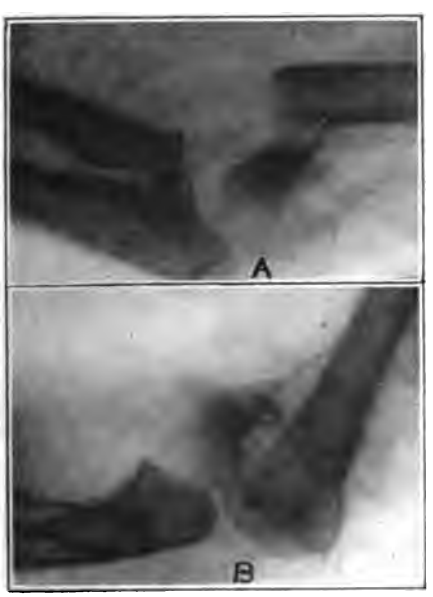


Fig. 5.

tension except for certain special reasons; that is, if when a case was brought to me the bones were found to be in correct position, they were allowed to remain so. There is no question in cases of fracture through the condyles, or in all fractures which extend into the elbow-joint, that by placing the arm straight on a side plaster-of-Paris splint the normal position of the radius and ulna at the wrist and the traction made by the ligament attached to the upper ends of these bones upon a fragment of the humerus will bring it more nearly to a normal position. Many cases could be reported. As evidence in this particular case the two pictures will show practically a perfect arm in so severe a fracture as is shown in the radiograms attached.

Fig. 5 shows an epiphyseal fracture of the lower humerus. Under a general anesthetic this bone was replaced and the arm was dressed in complete extension. The bone was replaced by passing a chisel in around over the head of the lower end of the shaft and against the epiphysis; and by a prying movement which required swinging the forearm not only outward, but forward, replacement was secured with some difficulty. A functional usefulness of this arm is all that could be expected, there being almost complete extension and rotation.



Fig. 6.

Fig. 6, showing the arm in extension and flexion, is evidence that functional usefulness is practically perfect.

The letter herewith printed is self-explanatory. This is the credit that a certain cult gives the surgeon for rendering extraordinary service in these most difficult cases:

S. L. McCurdy, M.D.

Dear Sir—Enclosed you will find three cards or pictures of the arm as you requested. I must tell you now about the healing of that arm. You set it, but God healed it, as the saints of God came and prayed for the healing, and you know we never lost an hour's sleep and he never suffered any pain. All credit and honor where it belongs. I hope these pictures will be satisfactory to you.

Yours respectfully,

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Fig. 7 shows a compound dislocation of the elbow-joint with fracture of the external condyle, including the radial articulation, with laceration of the extensor muscles and a fracture of the olecranon process. The arm is thrown almost back upon itself, completely exposing the articular surfaces. Patient expected amputation. Restoration of the parts was performed about as follows: Reduction of the dislocation and suturing of the extensor group of muscles back on to the external condyle after it was replaced. This fragment was not wired into position because it appeared to remain

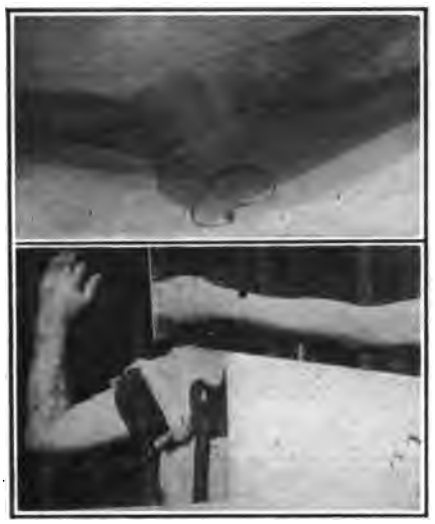


Fig. 7.

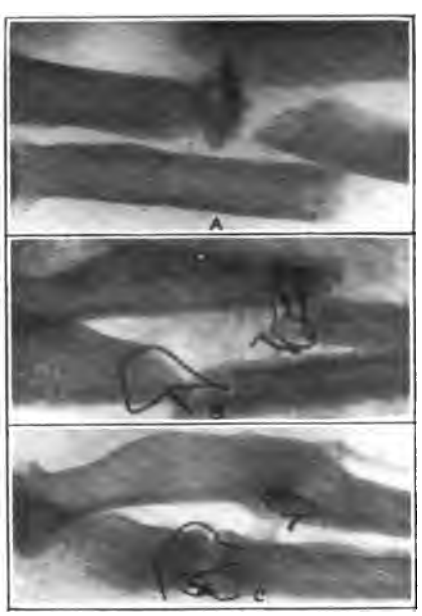


Fig. 8.

in place after adjustment. The wiring of the olecranon process, as shown in the figure, was done, followed by closure of the wound. The elbow was torn open from the posterior external surface, no damage being done to the nerves or bloodvessels. This joint was treated about 15 years ago. This fact is mentioned to show that for a great number of years the writer has treated all of his elbow-joint fractures and injuries in complete extension, following the advice of Oscar H. Allis, as commented upon elsewhere. The wound healed without complication. In eight weeks from the date of injury

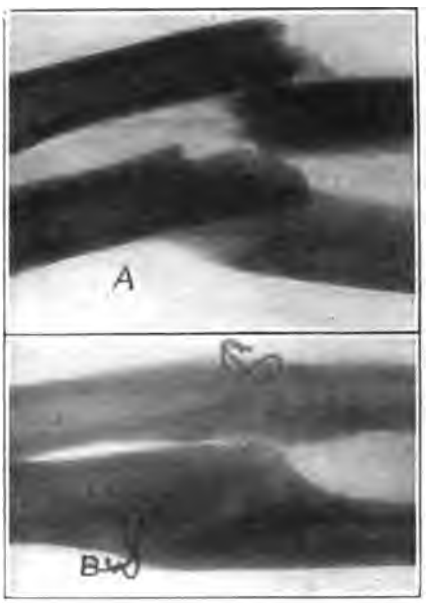


Fig. 9.

an anesthetic was given and the adhesions broken up around the joints. This was followed by passive

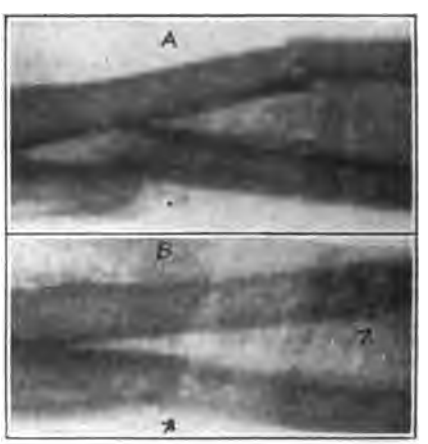


Fig. 10.

motion. The final result is shown in Fig. 7. The arm is in complete extension and flexion, the patient returning to his duty as fireman of a locomotive. *Immediate passive motion,* that is, before complete union of the bones, has never been practiced by the writer and was not practiced in any of the elbow cases herewith reported, for the reason that such meddlesomeness interferes with the repair of bone and stimulates exudation, encouraging rather than preventing ankylosis.

Fig. 8 represents a fracture of the forearm. A shows a marked displacement of the bone with de-

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tached fragment from the ulna. B shows the bones after the first wiring performed before the writer saw the case. When the case presented itself there was non-union of both bones. It required a second operation. C represents the bones six months after the operation. It will be observed that there is

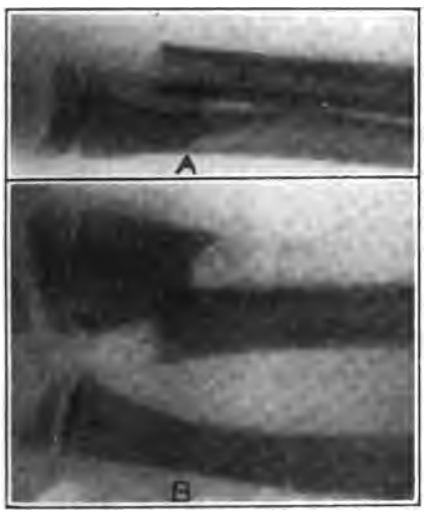


Fig. 11.

union between both of the bones, and that there is also a bridge of new bone extending from the radius to the ulna; also a new bone projecting along the upper surface of the radius toward the wrist—a myositis ossificans. In operating upon the ulna a piece of the wire which was used by a former surgeon was overlooked and still remains in the arm apparently doing no damage.

Fig. 9. This case was seen three weeks after the injury. The picture shows complete separation of the ends of the bone, which would have resulted in



Fig. 12.

great deformity but for an operation to replace bones and hold them in that position by wiring. The result was perfectly satisfactory, no complications arising during the process of repair, and the man has returned to his usual occupation of plumber. The second picture (B) was taken two years after the injury.

Fig. 10 shows a fracture of the radius and ulna. When this case came into the hospital the arm was bent like the italic letter *f*, with complete displacement of both fragments laterally and longitudinally. As will be observed, the radius is in position in A. This was accomplished at the time of entrance into the hospital. The x-ray picture A was taken immediately afterward and showed that the ulna had not



Fig. 13.



Fig. 14.

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been reduced. A second effort was made which resulted in complete reduction of the ulna, as shown in B. No operation was performed in this case, since to have operated would have been very meddlesome surgery and could not have produced nearly as good a result as the method which was herewith used.

Fig. 11 shows fracture of the forearm an inch above the wrist joint. This is not a typical Colles', and is introduced to show the second fracture of the ulna, two inches above the wrist, due, as the report was given to me, to an effort on the part of the attending physician to reduce the fractured radius. Open operation was advised, but the patient did not present himself for treatment.

Fig. 12 is introduced to show a very extensive fracture, namely, of the radius and ulna near the wrist, and an epiphyseal separation of the lower end of the humerus. The case was seen by the writer



Fig. 15.

one year after the accident when the arm was practically helpless—claw fingers and great impairment of usefulness of the hand—a typical Volkmann's ischemic paralysis and contraction due to the destruction of the musculospiral and other nerves at the elbow. Practically nothing could be done for the case. It is introduced to show the value of x-rays and to state that if reduction had been accomplished at the time of the accident a much better arm would have been obtained.

Fig. 13 shows a fracture of the femur seen three weeks after the injury. Open incision and wiring were done, with the result as shown in Fig. 14. It will be observed that this is an oblique fracture with complete lateral displacement. To make a reduction the ends of the bone were swung around each other and brought into place. It will also be observed that a wire was thrown entirely around the ends so as to hold them in position, which was a much easier and a much more effective method than wiring through the hole. An extraordinary provisional callus will also be seen in the figure. This was undoubtedly due to the fact that the fragments were out of position for three weeks, and the periosteum was torn from them and held there by a blood clot which permitted the early development of some new bone, which was not destroyed during the wiring. Patient is now walking about without crutches or support with a complete union.

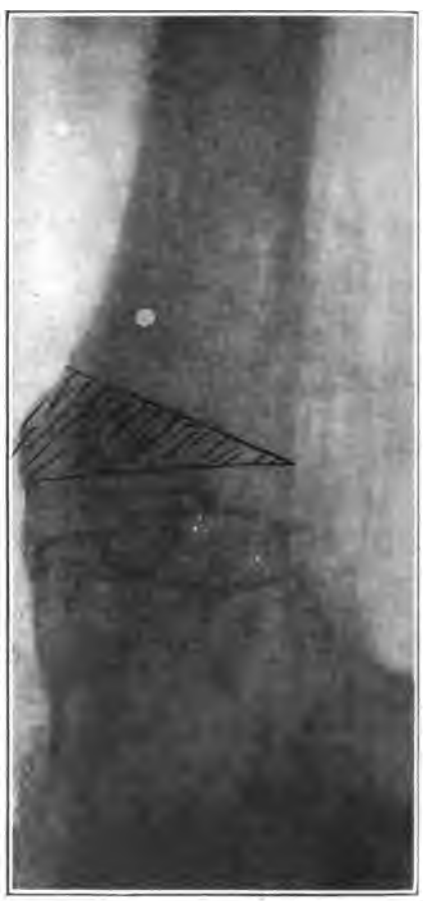


Fig. 16.

Fig. 15 shows a marked displacement of the femur seen several months after the accident, with only partial union. It will be observed that a great quantity of new bone has been thrown out, reaching from the upper end of the lower fragment across to the shaft. To correct the outward displacement of the knee, as well as to prevent curvature in the femur, an operation was done and the bones brought into apposition and wired. This resulted in a per-

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fectly straight femur with union and functional usefulness in the joint, with the expectation of slight impairment of flexion due to the adhesion of the muscles to the bone following so extensive laceration.

Fig. 16 shows severe injury of the knee with fracture of the femur, resulting in a bowing outward of the shaft five inches above the joint. Operation



Fig. 17.

for the correction of the deformity was the removal of a wedge of bone, as shown by the ink marks. This permitted a complete correction of the displacement. The wires shown were used by the surgeon at the time of the original injury.

Fig. 17 shows a comminuted fracture of the upper end of the tibia, where there were possibly six



Fig. 18.

or more fragments. Treatment for a fracture of this nature is to hold the bone in proper position to permit union to occur, since the chances are that all of the fragments have a sufficient circulation to guarantee a union. Meddlesomeness in the application of bone plates or other open methods might result in exfoliation or interference with union, requiring a prolonged period for repair.



Fig. 19.

Fig. 18 shows a fracture of the tibia seen four weeks after the accident, when the foot was turned in at right angles to its normal position. The opera-

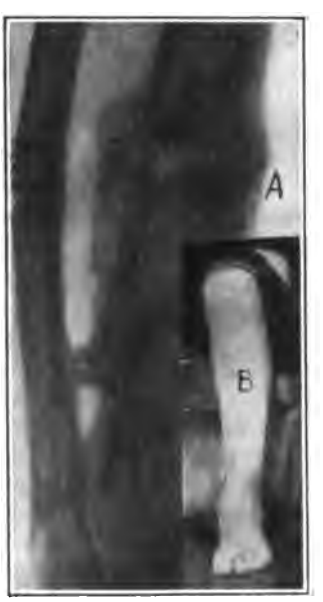


Fig. 20.

tion consisted in freshening the ends of the bones and wiring both tibia and fibula. The result was entirely satisfactory in two months.

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Fig. 19 is introduced in the series of fractures to show to what extent repair will take place in cases where replacement of bones has been anything but perfect.

Fig. 20 shows a fracture received five years previous to the taking of the x-ray picture shown in A. He had been using crutches for five years. B shows leg two months after the operation, when he was able to walk. The operation consisted in the removal of about three-eighths of an inch of the fibula and freshening the two ends of the tibia,



Fig. 21.

which were united. The leg was straightened and the bones were wired. The tibia united without any difficulty. At least two operations had been performed after the accident without securing union.

Fig. 21 shows x-ray picture of legs in case where both bones in both legs were fractured. Practically two inches of bone was removed from one leg, and the other leg, being obliquely fractured, was permitted to shorten before wiring. This meant allowing the fibula to overlap at the point of fracture. Union occurred without complication. The man was about two inches shorter than before the accident. The picture shown was taken about two years after the operation, and as will be observed, the iron wire which was used in the right leg shows a very faint line, indicating the claim which has been made by the writer that iron is a normal constituent of the blood and that iron wire will gradually disintegrate and eventually disappear.

MENTAL SYMPTOMS FOLLOWING CRANIAL INJURIES.*

By HENRY A. COTTON, M.D.,

Medical Director, New Jersey State Hospital, Trenton, N. J.

In discussing this subject we have thought best to omit the consideration of the severe injuries causing immediate death or death within a few hours by reason of fractured skull and severe hemorrhage. Injuries of this type produce coma or delirium and death. Operative procedures seem to have little effect upon the final outcome of these cases, and as they are familiar to you I will not take up your time by discussing them further. This leaves us then the rather broad group of traumatic neuroses and traumatic psychoses.

Traumatic neuroses may be characterized as the functional effects of injuries of the central nervous system. Some authors have regarded these neuroses as being due to pathological lesions in the central nervous system; others consider them entirely functional.

As many symptoms are subjective it is not uncommon for them to be considered as feigned, but this view is open to serious criticism. Of course, when patients suffer from a traumatic neurosis and are especially interested in damage suits against railroads or corporations, one has to be extremely careful in making an examination and in giving an opinion as to the nature of the trouble. It is extremely difficult to detect malingering in these cases. Then one has to consider the very important effect of suggestion in certain neuropathic individuals. Frequent examinations and constant reiteration of symptoms may be the cause of a neurosis by focusing the patient's attention upon subjective phenomena.

Under the head of traumatic neuroses we classify traumatic neurasthenia, traumatic hysteria and other unclassified forms. These types are so well recognized that it will be necessary only to give a brief description of them. One important point may be made, and that is: that the extent of the injuries does not always bear any direct relation to the neurosis. Physical injury may be very slight but the accompanying nervous disorder may be very severe. Physicians appearing for the railroad are

* Read before the third joint meeting of the Railway Surgeons' Associations, Pennsylvania Lines East and West of Pittsburgh, June 19 and 20, 1914.

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inclined to minimize nervous symptoms following slight injury, the usual opinion being that these patients fully recover when the suit is settled satisfactorily. When the physical injury is slight then one is forced to conclude that the psychic shock is more important than the trauma. It is often difficult to decide which is the most important factor in the causation of a neurosis.

Traumatic Psychoses. Traumatic psychoses under the head of traumatic insanity belong to the class of cases of which we have very little definite data in the literature. They form a relatively small proportion of the admissions to insane hospitals, and up to a few years ago they have not been at all carefully described.

In January, 1904, Dr. Adolp Meyer, under the title of "The Anatomical Facts and Clinical Varieties of Traumatic Insanity," gave the first reliable data with regard to these cases. Unfortunately we have not been able to describe traumatic insanity as an entity. In other words, there is no well recognized form of mental disease characterized by constant symptoms to which we could give this name, and in defining this class of cases we have to divide them into types essentially functional and essentially organic. The symptoms are not clear and distinct in the two classes, and it is frequently difficult to determine whether certain symptoms are the result of an organic lesion or merely of a functional disturbance.

Meyer quotes Guder as giving several types of what he called primary traumatic insanity in a table of forty-five cases. First, the typical delirious forms which accompany meningitis. Second, delirium which constitutes the solution of the somnolence which is referred to by Bailey. After the delirium there is a long period of head and functional disorders of innervation, usually permanent defect of memory, states of stupor in which the patient awakens from the coma dazed, with weak memory, irritability, insomnia, intolerance for alcohol, dizziness and headache, states of anxious agitation and depression, subjective auditory and visual sensations and motor disorders. Dullness is especially characteristic.

Meyer describes two groups of cases: Primary and secondary traumatic insanity. In the primary group his cases showed a certain tendency to dream-states, clouding of consciousness, fabrication of whole situations, inconsistency of statement, but no hallucinosis. One of three cases exhibited some after-effects until a bone splinter was removed. One recovered. Another showed periodic depressions which could not be ascribed to trauma. In the primary group there were certain cases which presented general after-effects. These may be summed up briefly as a mental weakness manifested by fatigue, slowness of thought, inability to retain impressions, irritability and a large number of unpleasant sensations, above all headaches and dizziness. Periods of amnesia in the event of accident are particularly apt to occur in these cases.

Is it possible to note any relation between the special types of injury and form of psychoses? Meyer thinks there is. Thus a lesion of or over the convexity produces epileptic or at least epileptiform disorders. Basal fractures lead, first, to initial delirium and, secondly, to paranoid development. Ziehen distinguishes between primary and secondary traumatic psychoses and the traumatic psychopathic constitution. There is no question but there are frequently other things which enter into the etiology of traumatic psychoses aside from the trauma. Constitutional peculiarity seems to be a factor, and frequently alcoholism is associated with traumatism. A question, then, which it is difficult to answer is: Would the patient have developed the mental disorders without the injury? Secondly, does the mental disorder show typical traits which speak for trauma?

The frequent occurrence of epileptiform convulsions following injury is of therapeutic importance. Therefore, when these convulsions assume a Jacksonian type they are of help in locating the lesion. Many cases are on record in which the mental condition has been relieved by operation, even after long periods following the accident. Booth reports a case which I have had the pleasure of seeing—a young man who fell from a scaffolding striking on his head. This patient remained in a local hospital for a number of years. Finally after six years it was decided to consult a neurologist to see what operative procedures could do. The man had gotten into a dull stupid condition, was somewhat confused, and unable to perform any work. An operation was decided upon at the seat of a lesion which was further localized by the appearance of tremors and weakness of the hand of the opposite side.

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Operation was performed and a large cyst about the size of a half-dollar was removed, with the result that the patient made a complete recovery both mentally and physically.

Another interesting case where an operation was performed some years after an accident is a man at the State Prison, whose history I am able to report through the courtesy of Dr. Reddan. In brief, the man was an Hungarian, between forty and fifty, who bore a good reputation in the town where he lived. On one Sunday when a celebration was taking place at a neighbor's house where things had become somewhat noisy and disorderly, he went in and attempted to quiet the disturbance. He was apparently hit on the head with a bottle, and after the blow he apparently became unconscious and had no recollections of the events which followed. In the melee some one was killed and the patient was accused of the crime, tried and convicted of murder in the second degree, and sentenced to thirty years in State Prison. At the prison he was unmanageable, refused to be dressed, was unable to talk intelligently either Hungarian or English and yelled most of the time. He would climb about the cell and in every way acted like a typical madman. This condition continued about three years. Dr. Reddan's attention was drawn to this case. Examination showed evidence of depressed fracture. A trephining operation was performed with almost miraculous results. After coming out from the anesthetic the patient appeared quieter and rational, talking intelligibly in English and Hungarian, and from that time on he showed a complete change of character and disposition. None of his previous mental symptoms were present, and to-day this man is entirely rational, but with loss of memory of the events of the fight three years ago and of the following period until the operation. The fortunate results achieved in this case are rather unusual, and to some extent spectacular, but as I have seen the man on several occasions I can vouch for the truthfulness of the history. He is now up for pardon which seems likely to be given.

Often, however, the results are not so fortunate, as the following history will illustrate: The patient is a man, thirty years of age, who was employed as foreman of a gang of foreigners in a gas and water company. The history as given by his mother was that he was a perfectly normal individual until he was struck on the head with some implement by one of the foreigners whom he had corrected or discharged. Immediately following the injury the patient was dazed, confused, and was sent to a private sanitarium. A few months later an x-ray was taken and showed a depressed fracture in the occipital region. Operation was performed over this area, and the inner table of the cranium was found to be fractured and pressing on the dura. Complete removal of this area was made, but unfortunately there was no change in the patient's condition. He is still, after three years, in a dull, confused, apathetic mental condition. He is not demented. He knows what is going on about him, but seems to be in a sort of dreamy state. The question arises in this case whether or not the sella turcica has not been injured, thereby causing some disturbance in the functioning of the pituitary body. A rather complete investigation had been made in this case of the metabolism which revealed polyuria and very high sugar tolerance, the patient taking 900 gm. of levulose without causing sugar to appear in the urine. An x-ray taken to show the pituitary region would lend some strength to this view.

Another case of interest is reported of a boy, nine years of age, who was struck by a trolley car. He sustained no apparent fracture of his skull, and the x-ray picture revealed none. He was apparently a normal boy before the accident. Following its occurrence he was somewhat dazed, confused and soon settled into a resistive, negativistic condition. He refused to walk or talk, had to be fed by hand, resisted dressing and undressing, and for a time showed violence toward his baby brother. He has continued in this condition for the last few years. He sits in a corner with his head bowed, seldom looking up, and everything has to be done for him. The injury the boy received was very slight and was merely a concussion. There were no immediate symptoms of organic trouble. It seems very difficult to explain his present condition on the basis of trauma. He has had peculiar convulsive attacks which may be hysterical, or epileptic, as they have not been observed by physicians. The boy recovered ten thousand dollars damages and the father seven thousand five hundred dollars for his care of him. I was inclined to consider the case one of traumatic hysteria rather than an organic condition and think the prognosis is fair.

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Many other cases could be cited of traumatic conditions, but this I think will give you some idea of the variety of types showing why we can consider traumatic insanity as a unit or an entity.

Another interesting class of cases is that in which the trauma acts as an agent in bringing out latent organic diseases, especially in general paralysis. Many cases have been reported and observed where the patient with a history of previous syphilis, but showing no organic brain symptoms, received an injury to the head. Immediately afterward very marked symptoms of paresis developed, and frequently the company was called upon to pay damages for the cause of the trouble. It is difficult to explain why a severe injury to the head or a very mild one should give rise to paresis, and it is certainly true that this would probably have developed without the trauma, but perhaps not for some time. Probably a great many cases of this type have shown some symptoms of paresis before the injury, but were not observed by the family. Their prognosis is difficult to determine, and frequently the most hopeless cases entirely recover where there is no grave organic injury. This can be relieved by surgical procedure and functional conditions seem to offer the best prognosis. In all cases where there is no evidence of a depressed fracture the x-rays offer a very valuable means of diagnosis and surgical measures are encouraging. In some of the cases where the direct effect of the injury does not seem to be the cause of the trouble, a complete investigation of the condition of the metabolism seems to me of importance.

Sarcoma of the Long Bones.—Dr. W. B. Coley (*An. of Surgery*, November, 1914) discusses some of the problems in the early diagnosis and treatment of this condition. The chief requirements for the early diagnosis of sarcoma of the long bones are summarized as follows: 1. A more careful study of all known clinical data. 2. A larger clinical experience in the diagnosis of sarcoma of the long bones. 3. Early and repeated x-ray examinations in all cases of suspected swellings of the long bones, especially those following trauma. 4. Exploratory operation and miscroscopic examination of the tissue removed in selected cases, but not as a routine measure. 5. Realization of the importance of not placing implicit reliance upon the negative report of the pathologist, especially when in conflict with clinical and x-ray evidence that is strongly positive.

DISEASES OF THE NOSE, THROAT AND EAR FROM THE PRACTITIONER'S VIEWPOINT.

By James Joseph King, A.B., M.D., New York.

Attending Laryngologist, Hospital for Ruptured and Crippled; Chief-of-Clinic, Ear, Nose and Throat, Gouverneur Hospital; Clinical Assistant in Otology, New York Eye and Ear Infirmary.

(*Continued from April issue.*)

Examination of the Upper Respiratory Tract.

The examination of the upper respiratory tract, with the exception of the mouth (including teeth, tongue, and gums), is effected by light reflected from some form of mirror. The source of illumination may be sunlight or artificial light. As sunlight is not always available, artificial light is generally used.

By inspection of the general physiognomy of the face, some idea is obtained of the character of the respiratory function of the nose. By the appearance of the teeth and nose; the presence of adenoids may be suspected. A sharp narrow face, protruding upper teeth and upper lip, with narrow nares, is indicative of adenoids in the naso-pharynx, either past or present. The tongue is inspected for evidences of both constitutional and local disease.

The naked flame of an argand burner, using either oil or gas, or, preferably, an argand burner provided with a Mackenzie condenser, is the most convenient source of illumination. Where electricity is available, it offers many advantages over other light. In my office, I use the Coakley lamp and stand with a Mackenzie condenser. It consists of a lamp mounted on a stand in which a frosted bulb containing a spiral filament may be accurately centered opposite the focal distance of the mirror. The advantages of this light, as stated by Coakley, are: "The light from the twenty-candle power lamp is very brilliant and sufficient to thoroughly illuminate the deepest portions of the nasal cavities, larynx, and trachea, during operations. Its portability, easy adjustment in height, and the simple mechanism for changing the direction of the illuminating rays, are valuable features."

For emergency cases or for bedside use an ordinary drop electric lamp or a candle may be used. There are now upon the market many forms of small dry-cell electric lamps which are

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very convenient for such use. I have recently been using a little electric light which may be



carried in the pocket, very similar to a fountain pen.

Mirrors. The head mirror consists of a round, concave glass, varying in diameter from three to four and a half inches, with a focal distance of eight to ten inches. The reflector has a central



Fig. 14. Head mirror.

aperture, which should be placed before the eye of the observer, enabling him to bring the line of vision parallel with and directly within the center of the reflected light. The mirror is attached to a head band by means of a single ball and socket joint. There are many varieties of head bands upon the market, but the ones I have found most comfortable are either a heavy leather band or a hard rubber head band. The mirror should be so adjusted that the aperture in its center is just over the pupil of the examining eye. Some use the mirror over the forehead.

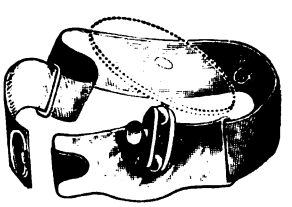


Fig. 15. Head band with ball and socket joint for attaching head mirror.

It is well to learn the use of both methods. Whether the mirror be over the forehead or over the eye, both eyes should be used in making the examination. With the aperture of the mirror over the pupil of the left eye, the test of whether both eyes are being used is to close the right eye, and if a clear view is obtained with the mirror over the left eye both eyes are focussing.

During an examination of the upper respiratory tract, the patient should be seated in a high-back chair, with the head resting against the back of the chair. The examiner should be seated in front of the patient upon a stool, similar to a piano stool, with screw seat, so that the height of the examiner may be adjusted to that of the patient. The source of light should be placed to the right of the patient on a level with and just behind the line of the ear. The examiner's head should be at the same height as that of the light. His distance from the patient should be that at which the mirror reflects with greatest illumination of the part to be examined, i. e., the focal distance of the mirror. The adjustment of light should be made by rotating, elevating or depressing the mirror and not the head of the examiner. After the light is properly focused, the head of the examiner should be in a comfortable, natural position. Beginners often try to adjust their own heads rather than the mirror, and thus assume strained positions.

RHINOSCOPY.

The examination of the nasal fossae is called rhinoscopy. The nares are examined and the conditions present are recognized by illumination and by inspection. If the view is obtained through the nares, it is called anterior rhinoscopy. If the view is obtained by means of an image in a mirror or a light placed in the oropharynx, it is called posterior rhinoscopy.

Anterior Rhinoscopy. This examination is made by dilating the nostril with a nasal speculum, focusing the light so that it illuminates the

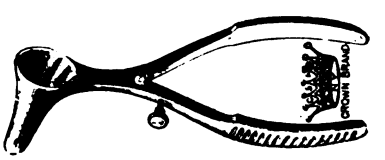


Fig. 16. The Vienna model nasal speculum. In my experience the most useful nasal speculum.

nasal cavity, and observing the conditions present. The cavity may be inspected very superficially by having the patient tilt his head backward and slightly elevating the tip of the nose with the thumb. A number of instruments have been devised for dilating the nostrils, but I prefer the one known as the Vienna model, as suitable for most purposes. The Myles', a so-called self-retaining speculum, is also a serviceable instrument. The wide-bladed speculum of Bos-

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worth has been a favorite, and for small children I frequently use it. It is small and less formidable than many of the others, and for this reason it is less apt to frighten children. Most

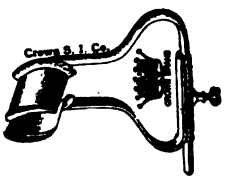


Fig. 17. Myles' self-retaining nasal speculum. The blades should be inserted with the handle upward.

of the so-called self-retaining specula are of little value, because if the nostrils are sufficiently dilated for them to be self-retaining they cause the patient unnecessary pain and their continued

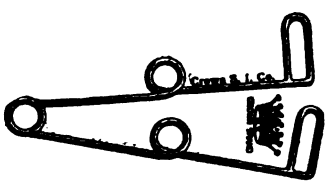


Fig. 18. Bosworth's nasal speculum. Useful in the examination of children.

use will produce an enlarged and unsightly nostril.

There are three positions for anterior rhinoscopy. For examining the floor of the nose and inferior turbinate, the patient's head should be tipped forward and downward, as the floor of the nose inclines inward, backward and downward. This position affords a good view of the floor of the nose, the inferior turbinate body, and the inferior meatus. For the examination of the middle turbinate body and the middle meatus, the patient's head should be in a natural, erect position. For the examination of the superior portion of the anterior nasal cavity, the head should be tipped well back.

The speculum should be held in the left hand when the right nostril is inspected, and in the right hand when examining the left nostril. By moving the patient's head upward and downward, inclining it to the right and left, every portion of the nasal cavity may be inspected, the location of pus in the meatuses, the condition of the turbinates, the condition of the septum, etc., may be observed. If there is much secretion within the nasal cavities, it is advisable to wipe it out with cotton wound applicators. Much information is obtained by using a probe, as by this means the consistency of the various parts may be ascertained. An enlargement of the posterior end of the inferior turbinate may often be felt when it cannot be seen.

Posterior Rhinoscopy. The observance of a few rules will make this examination fairly easy. The tongue should be depressed with a tongue depressor, and the mirror introduced very carefully,

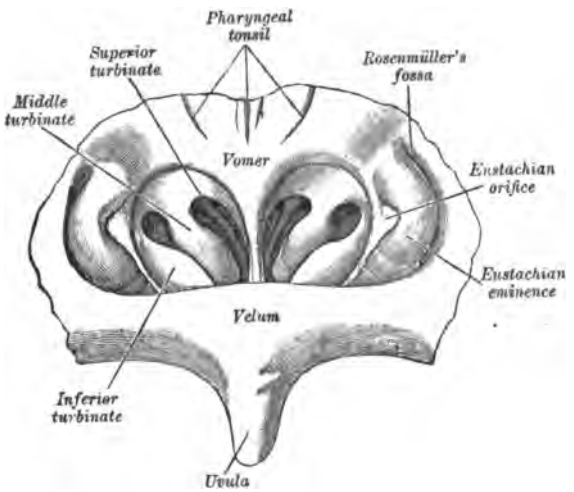


Fig. 19. Posterior rhinoscopic image.

avoiding the uvula and soft parts. The patient is instructed to breathe naturally through the nose. The mirror is carefully dried and warmed by passing it through a flame. To avoid introducing it so hot as to burn the patient, it should be touched to the back of the hand which is more sensitive than the palm. The patient is asked to



Fig. 20. The mirror is held by the fingers just as a pen is held. "Diseases of the Nose and Throat," Coakley.

breathe naturally and entirely through the nose and then to drop the lower jaw gradually. In this way the soft palate will remain relaxed. If the patient can be made to say "hat" with a nasal twang, or to pronounce the French "R," the soft palate will relax. The mirror should be held in the hand exactly as one holds a pen. Thus

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its position may be controlled by rotating the handle with the thumb. When it is thus introduced, the parts may be observed by rotating the mirror from left to right and by depressing or elevating the handle. All backward and forward movements of the mirror must be avoided, as the soft parts would be touched and the irritation would certainly cause retching.

In rhinoscopy, either anterior or posterior, if the instruments cause the slightest inconvenience, they should be withdrawn and reinserted after the patient has rested a moment or so. In smokers or those with chronic sinusitis and pharyngitis it often requires considerable patience before a good view can be obtained. Occasionally it is necessary to cocainize the parts before a satisfactory examination can be accomplished.

(*To be continued.*)

ARTHROPLASTIC OPERATION FOR RIGHT TEMPORO-MANDIBULAR ANKYLOSIS.

By M. DANZIS, M.D., Newark, N. J.

Visiting Surgeon, Newark Beth Israel Hospital.

Morris M., aged 10, native of Russia, two years in this country. Patient had the ordinary diseases of childhood from which he recovered without any sequelæ.

Four years ago he was thrown off a swing, landing directly on his chin, and sustained a lacerated wound on the outer and under surface of the inferior maxilla directly over the mental protuberance. He also had considerable bleeding from his right ear followed by a slight oozing, which lasted for several days. He received medical treatment in the outdoor dispensary for a period of one week, after which time he was apparently cured.

About two weeks after the accident he began to have considerable difficulty in opening his mouth, and within a short time the limitation of motion of the lower jaw became so marked that he could take hardly any solid food, being compelled to force his food between his teeth with the aid of his fingers.

He was again placed under the care of a physician who made some attempt to remedy the condition, but it seems he met with very little success. He finally advised the use of a metal instrument with which the mouth should be forcibly opened several times a day. The patient continued the use of that instrument for a period of almost two and one-half years without any result, and in the summer of 1913 he was admitted to the Newark Beth Israel Hospi-



tal. Operation, however, was refused, reliance still being placed on the instrument for a cure.

In August, 1914, he presented himself for treatment at the office of Dr. J. Kussy still suffering from the same degree of ankylosis, and upon his advice the patient was admitted to my service, on August 23, 1914, for operation.

Examination revealed the following conditions:



(1) Right side of the face full and rounded.

(2) Left side rather flattened.

(3) Downward motion of the jaw limited to ⅛ inch, requiring great effort to reach a maximum of ¼ inch.

(4) Chin deviated slightly to the right side.

(5) When attempting to open his mouth the lower jaw slips forward and then deviates to the right.

(6) Considerable trouble in taking nourishment, particularly solids.

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X-ray examination revealed nothing of diagnostic value.

A diagnosis of right mandibular ankylosis was made and an arthroplastic operation decided upon.

Operation, August 27, 1914, under ether anesthesia, Dr. Kussy assisting. The technic described by Dr. J. B. Murphy was closely followed. The joint was exposed by an L-shaped incision, the perpendicular portion of which was in front of the ear, beginning in the hair line two inches above and extending down to the zygoma. The horizontal portion was about one inch long, running parallel with the zygomatic arch.

The flap thus formed was dissected upward and outward, the soft tissues separated by blunt dissection, and when the bone was exposed the ankylosis was found to be of the intra-articular variety, probably due to some infection following the injury sustained in the fall. Then we carefully separated the structures surrounding the neck of the mandible, bearing in mind particularly the close relationship of the internal maxillary artery to its under surface. After having thoroughly freed a portion of the neck, a small periosteal elevator was passed around its under surface, and with the aid of a dental burr we removed a portion of bone with the periosteum intact, about a ¼ inch in width, leaving a gap wide enough to permit the introduction of the tip of the little finger. The jaw immediately became relaxed and dropped down and we could open the boy's mouth with ease.

We then outlined a U-shaped flap about 1 inch wide and 1½ long, consisting of fat and aponeurosis covering the temporal muscle, with the base attached to the upper margin of the zygoma. It was dissected downward and tucked into the gap previously made by the removal of the portion of bone. It was then securely attached at its base by catgut sutures at both angles and also fastened to the fascia in order to retain it in position.

The skin was closed with horse-hair sutures without any drainage. Dry dressings were applied and no further effort was made to move his jaw for the first two days.

Post-operative condition: There was a considerable amount of edema on the second day after operation. Two sutures were removed, which was followed by the escape of some clear serous fluid and the edema gradually subsided.

On the third day passive motion of the jaw was instituted and the nurse instructed to introduce a wedge-shaped intradental wood block between his right molars and leave it in position for a few minutes, four times daily.

On the fifth day we noticed a sero-purulent discharge at the lower angle of the wound and a small rubber drain was inserted. The remaining sutures were removed on the seventh day with primary union of the wound except at the lower angle. The edema had completely subsided. The use of the wood block was continued. Patient could open his mouth sufficiently to take solid food, mastication giving him no pain.

October 15, right side of the face still fuller than the left. Still some lateral deviation of the jaw. Downward range of motion good. Masticates his food without any difficulty. Small sinus still persisting.

October 19. Condition the same with the exception of paralysis of some filaments of the facial. General functional result is good.

December 28, sinus completely healed. Still some lateral deviation. Range of motion good; masticates freely any kind of food. Result in general is very gratifying.

THE TREATMENT OF FRACTURES.*

By S. E. HANNON, M.D., Columbia, S. C.

I have nothing new to offer you in the treatment of fractures, except what may be found in any good up-to-date text-book; neither shall I attempt to cover the whole subject. My only purpose is to try to stress a few of the most important points in the handling of fractures in our work as railroad surgeons. The fundamental principles in their treatment are to assist nature in repairing the damage to as nearly normal condition as is possible by proper reduction and fixation.

First of all, when we are called upon to treat some poor unfortunate with a fractured bone it is our duty to diagnose the condition, the character of the fracture, so that we can handle each and every case to the best advantage of our patient. There was a time when all we could do was to place the injured parts in the best position possible according to our own judgment, and trust to nature and luck that the fracture was in good position. Such is not

* Read before the thirteenth annual session of the Association of Seaboard Air Line Railway Surgeons, October 19, 20, 21, 1914.

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the case with us now, for we can in most instances get our patient to a radiographer. First, place the parts in the most comfortable as well as the most normal position, and apply some form of fixation splint. Next have an x-ray plate made if practicable, and generally this can be done. Then we will be able to see just how much deformity is present, and by having a thorough knowledge of the best procedure in handling each particular case we are enabled to obtain the best results.

In most instances it is of decided advantage to anesthetize the patient because we can do very much better work and without inflicting any pain. Correct the deformity and place the limb in some form of permanent dressing. After this is done another x-ray plate should be made to see if we have succeeded in getting the fragments in position.

In compound fractures we should never touch the parts, and avoid probing, wiring, nailing or plating. Place the limb in the best position possible. Cleanse the surrounding uninjured area with alcohol, gasoline or soap and water, always bearing in mind not to allow any contamination of the wound. Then with dry sterile sponges cleanse the damaged tissues as far as possible. Remove all visible foreign material from the wound with sterile forceps and dry sterile sponges. Then fill the wound with tincture of iodine or alcohol to render the tissues as sterile as they can be made, and apply sterile dressings.

In compound fractures we will most certainly have some degree of infection. Therefore, by not handling or washing the already bruised and lacerated tissues we allow nature a better chance to bring about more perfect repair. Never plate, wire or nail a compound fracture under any circumstances until after nature has cleaned up the wound and all soft structures are healed, after which, if we find that the patient is not going to have a useful limb, we can open the wound under the most rigid aseptic precautions and deal with the conditions according to our findings. We should never convert a simple into a compound fracture by operative procedure until we have exhausted every other method at our command to correct the deformity and hold the bones in position, because our own experience and the best teachings of to-day demonstrate that bone is very susceptible to infection, and once infected it has not the power of resistance that the soft structures of the human body have, and especially the peritoneum. It takes a much longer time for nature to clean up the infected area and always leaves the bone in a greatly crippled condition. In many cases permanent deformity results, and oftttimes there is loss of a limb by amputation that should not have been sacrificed.

We should never attempt, under any circumstances, to do any bone surgery unless we have our patient in a first class hospital, and then only after we are sure of our ability and knowledge of surgical technic to perform such work.

There are a large number of men who are able to do fairly good work in general surgery, but are unable to get good results in bone surgery. I have seen case after case of bone work become infected that should not have been touched.

I am very glad to say that suppuration never occurred in any of my own cases. But I plead guilty of having plated a couple of compound fractures that were already infected before I learned better.

In conclusion let me plead: give nature a chance, help her. She is by far a better surgeon that we are. When nature fails, do not hesitate to come to her rescue with clean gloved hands, a clear head, and absolutely sterile instruments and appliances.

AFTER-TREATMENT OF FRACTURES.*

By ROBERT L. HARRIS, M.D., Jacksonville, Fla.

There is no branch of medicine where patience, caution, deliberation, skill and eternal vigilance mean so much to the physician as in the treatment of fractures. Every fracture treated is ever afterwards a circulating advertisement if the results are good; if bad, it becomes his nemesis, a walking monument to his discredit. A peculiarity about the latter cases is: they never die, leave town or forget. I shall discuss this subject in a general way, giving my deductions from personal experience and observation.

During the last year or two I have had occasion to correct several displacements six to ten days after the injury. In each of these cases (with one exception) reduction was made with ease and very little pain, the muscles offering practically no resistance. In some of the cases an assistant could easily pull the broken bones apart sufficiently for me to feel a decided sulcus between the ends and move them about freely without crepitus.

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The exception was a fracture at the lower end of the humerus. I saw this case in consultation with Dr. D. B. Williams, of South Jacksonville, a few hours after the accident, on September 11, 1914. We thought we effected a fair reduction without an anesthetic. Six days afterwards an x-ray was made which showed a fracture hard to classify. Two pieces of bone were standing out like a bridge, the outer ends in apposition. About the tenth day, assisted by Drs. L. E. Bransford and D. B. Williams, an attempt was made to reduce this fracture under an anesthetic. At the time there was considerable swelling and the outlines of the bone could not be easily determined. We were positive we had it in good position and the fragments pressed down in place. Another x-ray was made on October 13th, more than four weeks after the accident, and to our surprise and chagrin we found practically the same condition that existed in the first skiagraph. This is a nut yet to crack, and just what the final outcome will be time only can tell. It may be necessary to operate. In this case, had we not been so sure we had good position after the second reduction, another x-ray would have been made at once and possibly some different method pursued with better results. A feature that helped to mislead us was the total absence of pain after the second attempt at reduction.

In all of these cases, with the one exception referred to, the final results were unusually good, especially in the case of a fracture of the femur where there was less than a half-inch shortening with perfect alignment. This being an unusual case on account of the length of the fracture (the bone being split more than half its length) I have had plates prepared to show you.

I believe we have been too hasty about x-raying fractures, especially of the long bones. It is my opinion that we should watch every case carefully to ascertain when the swelling has subsided and the muscles have relaxed, with a view of making a careful exhaustive examination, correcting any displacement that may exist, and applying a permanent dressing, the character of which will have been decided upon and prepared for in every detail; in other words, give this procedure the importance of a secondary operation, as it were. I do not believe this particular stage is ever reached before the sixth or seventh, and frequently not before the ninth or tenth day. The adjusting of fractures at this period, so far as I could see, did not delay union. There was little reaction or swelling in any case.

At this stage, six to ten days after injury, the probabilities are that the space is filled with proliferating cells (fibroblasts) which have not as yet become vascularized, the leucocytes having destroyed the blood clot, which soon after the injury fills the space between bone ends and frequently invades the tissues sufficiently to cause a decided prominence at the seat of fracture.

In suggesting this secondary procedure as a routine, please do not understand me as disparaging the importance of an early reduction of fractures, and the earlier the better. When possible it should be done during the primary relaxation of muscles from shock.

I can recall several instances of delayed or non-union in which an x-ray examination made several weeks after the injury disclosed a relatively poor apposition of the bones, which had from external appearances and feel been thought to be good. The probabilities are, in a majority of these cases, muscle, fascia or periosteum was caught between the bones, preventing apposition and union. Is it not reasonable to suppose that had they received a secondary adjustment, the limb being strongly extended during the process, it would have straightened these tissues, pulled them from between the bones, and secured better results? The only question is whether or not this late manipulation interferes with final results.

Before doing a major operation it is customary to examine the heart, lungs, kidneys and frequently the blood. We inquire into the patient's habits and family history. We ascertain whether or not the patient has had syphilis. We do this for its bearing on the prognosis and to enable us to give treatment when indicated that will favorably affect convalescence.

Do we always make the above investigations in fractures? I fear not. Notwithstanding it is just as important, in fact, more so, to the physician, because he is always blamed for imperfect results regardless of the cause. We should be especially on the lookout for syphilis. It is a frequent cause of non- or delayed union and frequently overlooked.

I will depart from my text to the extent of mentioning the use of iodine in the treatment of compound fractures. Dr. W. H. Wilder, in an article on "The Iodine Technic in Surgery" in the *Southern Medical Journal*, August number, has this to say in reference to iodine: "Two solutions are

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necessary:—Solution No. 1 is made of one part of iodine crystals to 1,000 parts of benzin; Solution No. 2 is made of equal parts of grain alcohol and U. S. P. tincture of iodine which has been freshly prepared."

I have found the iodine technic especially valuable in the treatment of compound fractures. Solution No. 1 is freely applied first to the outside, then to the inside of the wound and dried off; then Solution No. 2 is applied in like manner, taking great care to disturb the parts as little as possible, and to keep the fingers out of the wound, applying the solution with sterile gauze on sterile forceps and removing only loose pieces of bone with sterile instruments. After this the limb is put in whatever kind of splint is best suited to the particular case; ordinarily I prefer plaster-of-Paris reinforced with thin wooden slats worked into the cast so as to strengthen it, and with proper windows cut, so as to allow for future dressings.

I have heretofore used water in cleansing compound fractures, but since reading Dr. Wilder's article I have adopted his method as a routine and shall continue to follow it until I have something better.

HIP-JOINT AMPUTATION: REPORT OF A CASE.*

By THOS. H. HANCOCK, M.D., Atlanta, Ga.

G. M., female, four years and nine months old, was playing in the street opposite her home when she was run over by a trolley car and her right thigh crushed at the hip-joint.

Her family physician was in her house at the time and rushed her to the hospital in his automobile, so that she was under an anesthetic in a few minutes after the accident. Chloroform followed by ether was given, the pins devised by Prof. John A. Wyeth of the New York Polyclinic Medical School and Hospital were inserted—not as given in his text-book where they are described as passing through the muscular tissue, but through about half an inch of integument—and the rubber tubing, which serves as a tourniquet, was applied around the limb above them. The operation was really not an amputation, as this had already been done by the car. The bone was sawed off at the trochanters, the head being left in place, and the soft tissues trimmed off smoothly, as there was not enough to cover over the stump.

She was given 1-20 grain of morphin hypodermically and put in a bed the foot of which was elevated. The morphin was repeated in three hours and this was the only stimulation she had. There was a punctured wound extending from the anal opening through the right side of the vagina which hindered the injection of a warm saline solution, but this was not necessary.

She made an uneventful recovery. The short time following the accident before she was placed under a general anesthetic undoubtedly had much to do with the result in this case. We have no drug that equals morphia to combat shock. It should be given in small doses and frequently repeated. Some of the books state that it should not be administered to children below ten years of age, and never hypodermically to those below the age of 15. I gave a three-year-old child 1-8 grain hypodermically when I was an interne, acting under the order of the visiting surgeon, and observed no bad effects, but I think this was a heroic dose. Strychnin, digitalis, brandy and last, but best of all drugs, adrenalin chloride, are useful, especially where there has not been much loss of blood. Strychnin antagonizes some of the effects of morphin, but any of the others can be given with it.

If there has been much loss of blood an intravenous injection of normal saline solution should be given. Thanks are due to Prof. Ehrlich, not only for introducing salvarsan, but for the skill which its introduction has given surgeons generally in making injections into the veins. When this is not practical the rectal injection of warm normal saline to which has been added an ounce of brandy is good. The temperature of the solution should be blood heat, and only a pint should be given at once or the bowel will expel it. It is also important to elevate the foot of the bed when it is given. The infusions into the cellular tissues are painful and the absorption is too slow to be very beneficial.

The first thought after an accident should be, "the doctor, how long will it be before we can get him?" The clearing of the track should be a second thought always. The surgeon should not be detained till the wrecker can be gotten out and manned, but he should be rushed on the first available engine to the scene of the accident when it is at a distance, This will not only alleviate suffering and save lives, but it will show the injured that all has been done that is possible to remedy the damage.

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Editorial Department

NEW YORK, JUNE, 1915

TETANUS IN THE EUROPEAN WAR.

Owing to the method of warfare in the trenches pursued in the present European war, infected wounds are the rule rather than the exception, and this also accounts for the formidable number of cases of tetanus infection. Although every effort is being made to discover more effective methods of treatment, the mortality has not been materially reduced. Thanks to the more general use of antitetanic serum after all injuries, there has doubtless been a considerable decrease in the number of cases of tetanus, but aside from its well established prophylactic value the serum has not proved a reliable curative agent. When employed at the onset of the disease it has exercised a favorable effect in modifying the severity of the symptoms, but in fully developed cases little if any benefit has been observed. In fact, on account of the limited supply, some surgeons have urged that its use be chiefly reserved for preventive purposes. The attempts made to eradicate the tetanus bacillus in the early stages of infection by wide excision of tissues and amputation, or by filling the wound with strong antiseptics, such as carbolic acid or chlorine water, have not been more encouraging than in the past. In view of the fact that the bacillus is anaërobic, it has been recommended that air be admitted freely into the wound and that impervious dressings be avoided. The use of oxygen gas or peroxide preparations has been throught to exert an inhibitory effort upon the growth of this organism, and for the same purpose exposure of the affected part to sunlight, or to the rays of the quartz lamp transmitted by glass rods introduced into the wound, has been suggested. But none of these measures has been tried on a sufficiently large scale to permit of positive conclusions as to its value, and the treatment of tetanus still remains essentially symptomatic. Among the newer remedies for controlling the convulsions, magnesium sulphate administered subcutaneously, intravenously or intraspinally is highly praised by some surgeons and equally condemned by others on account of the marked depression observed in many instances. There is no doubt that it is a double-edged weapon and requires great caution in its use. The Bacelli method of car-

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bolic acid injection has not met with much favor. Chloral, hyoscine, and morphin are still largely employed as sedatives. Indeed it would seem that until an effective antitoxin is discovered that will neutralize the virulent poison of tetanus after its fixation in the nerve centers, the mortality cannot be materially reduced, although the routine administration of anti-tetanic serum to every wounded soldier would soon cause so marked a decrease in the number of cases that the disease would no longer constitute the most dreaded complication in war surgery.

THE COMPLEMENT FIXATION TEST IN SURGICAL TUBERCULOSIS.

It is now the consensus of opinion of all investigators in the field of tuberculosis that in man this disease can be produced by the tubercle bacillus of the human as well as the bovine type, and also that the introduction into the system of the bovine bacillus is usually followed by surgical tuberculosis. The relative importance of the two types of infection, as shown by Keiler, is: 1. Infection in man by the bovine bacillus is less virulent than that caused by the human bacillus. 2. In the majority of cases the lesions are of slow growth and of small number in infection with the bovine type of bacillus, as compared with those due to the human type of organism in the same region. Keiler quotes the findings of Burckhardt and Oehleker to substantiate his conclusions. It seems, therefore, of great prognostic importance to ascertain, if possible, the identity of the bacillus causing the tuberculous infection. None of the methods now in vogue, however, seem to be available for every day use. The culture and inoculation methods employed by Frazer in his study of bone and joint tuberculosis are time-consuming and consequently cannot be adopted as a routine practice in a busy hospital. For this reason the complement fixation tests based upon the recent studies of Keller and Moravék are of great interest. In an investigation of the complement fixation of the blood in surgical tuberculosis, they found in a number of cases (9), that the serum caused the fixation of the complement when mixed with a bovine antigen and failed to do so if, instead of this, a human antigen was added; while some of the cases reacted to both human and bovine antigens. The importance of this observation is manifest, and we venture to say that the complement fixation method will enable us to demonstrate within twenty-four hours what heretofore has taken weeks to determine, and thus to greatly facilitate the diagnosis of surgical tuberculosis.

CANCER STUDY MEETINGS IN VERMONT.

The Vermont State Medical Society has commenced a campaign of education with regard to cancer. Dr. James Hamilton, secretary of the society, was responsible for the organization of the meetings. These were held from June 8th to 12th, in the cities of Rutland, Burlington, St. Johnsbury and Montpelier.

Clinics were held at the hospitals in the several cities by Drs. Jonathan M. Wainwright of Scranton, Pa., Francis Carter Wood of New York, and William Seaman Bainbridge of New York. The cancer problem as regards Vermont was fully discussed throughout the days and evenings during which the meetings were held, by Drs. Bainbridge, Dalton, Wainwright and Wood. The meetings were a success from every standpoint and augur well for the ultimate result in the fight against cancer; at any rate, so far as Vermont is concerned.

We take this opportunity of announcing to the readers of our journal that the July issue will be devoted to a consideration of the cancer situation. Papers have been received from such well-known authorities as Dr. William Seaman Bainbridge, Dr. Stewart Dodge Jessup, Dr. Samuel W. Bandler, Dr. W. P. Cunningham, Dr. W. Seton Russell, of New York, and Dr. E. H. Terrell of Richmond, Va.

OBSTETRICAL HINTS.

By RALPH WALDO, M.D., New York.

Pituitrin has been shown to be one of the most valuable remedies that we have to produce uterine contraction; but it should not be used before the cervix is completely dilated and the child's head engaged, and under no circumstances should it be employed when there is obstruction in the pelvis. It is of great value when the pains are weak and there is no other obstacle to delivery.

In many instances pituitrin has been given before dilatation of the cervix and engagement of the head, and this has resulted most disastrously to the mother or child or to both. In one case

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the condition was so serious that Cesarean section was performed and a contracted ring found in the uterus which grasped the child's head so firmly that it was very difficult to remove it through the uterine incision.

"Twilight sleep" has been quite thoroughly "tried out" in many hospitals throughout the country and a few practical facts have been proved:

(1) It is not indicated where the mother is suffering from organic heart disease, or the fetal heart is markedly affected by it.

(2) It does not prevent pain during uterine contractions, but, on the other hand, as soon as contraction ceases the patient passes into a semiconscious condition out of which she can easily be aroused and then answers questions rationally, but on being left alone quickly falls asleep.

(3) After delivery the woman falls asleep and remains so for several hours, and on awakening has lost all consciousness of her labor.

(4) In a small percentage of cases the patient is very much excited during uterine contractions and it is very difficult to keep her in bed. In some instances this has led to the administration of too large doses of the remedies.

(5) The use of "twilight sleep" is no contraindication to the administration of a general anesthetic if instrumental delivery becomes necessary. In fact, forceps should not be employed without the induction of general anesthesia, for "twilight sleep" is apt to make the patient very unruly.

(6) One dose *only* of narcophin or morphin should be given, and under no circumstances repeated.

(7) A competent nurse should be in constant attendance and should remain at least four hours after delivery. The patient should not be left for one minute.

(8) A doctor should be in constant attendance at first, and later should see his patient at least every half hour.

(9) The treatment should not be commenced until after labor is well established.

(10) The first stage of labor is probably slightly shortened, but the second is usually decidedly prolonged. When indicated there is no objection to the administration of pituitrin.

(11) Up to date it is the best method discovered to relieve the suffering during the first stage of labor, and when the surroundings warrant should be employed. With proper attendance it can be as effectively and as safely carried out at the patient's home as in the best equipped hospital.

(12) "Twilight sleep" does not always produce the results desired, but, on the other hand, when properly employed, is attended with very little if any risk.

Department of Railway Surgery

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THE PREVENTION OF ACCIDENTS.*

By JOSEPH M. WELLS, M.D., Trenton, N. J.

I would like to preface my remarks with a revision of an old proverb, "Prevention is worth tons of cure." "Safety First" has become the slogan of the P. R. R. Co., and cannot be repeated too often.

Until within recent years accidents were looked upon as necessary evils and very little was done towards their prevention. Now this is all changed and every effort is being made to reduce them to a minimum. Safety committees have been appointed from among the employees to arouse their interest and co-operation, rigid rules have been adopted, safety appliances put on all machines, pamphlets written and distributed to all the men, "Safety First" buttons given liberally, and lectures given to educate and interest all employees.

The majority of accidents are due to what may appear to the men to be trivial things. The removing of a guard from a machine for the sake of hurry, the wearing of loose overalls and blouses on the plea of economy, the neglect to wear goggles, and many things of a like nature.

I have been told by a supervisor that one of his most difficult problems is how to prevent his foreign laborers from being injured. The foreman will warn them by calling and blowing his whistle and, when he thinks he has them all in a safe position, one of them will suddenly cross the track in front of an approaching train. A Hungarian was killed in this manner a few days ago. As yet nothing has been found to prevent this kind of an accident. For

* Read before the third joint meeting of the Railway Surgeons' Associations, Pennsylvania Lines East and West of Pittsburgh, June 19 and 20, 1914.

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this purpose an educated Italian is preparing a lecture to deliver to his countrymen, explaining how they can protect themselves and others. As yet no one has been found to do this for other foreigners.

Where the third rail is in use the employees working around it should wear shoes with rubber soles and would thus be safe from accident.

Injuries to the eyes of enginemen and firemen are frequent. Many of these injuries could be prevented by these men wearing goggles, and when the engineman needs glasses for constant use he should have the pair that he wears while at work of the goggle form, thus protecting his eyes and correcting his refractive error.

I have seen a man seriously injured by pouring molten lead into a joint without finding out whether it was wet, the drop of water causing an explosion which threw the hot metal into his eyes.

Many of the accidents occur to trespassers, not simply to tramps, but persons crossing the tracks or walking on them at other points than the regular crossings. Sometimes passengers and trainmen are injured by boys and even men throwing stones at the passing train. Of course these accidents can only be prevented by the civil authorities punishing the guilty persons when they are arrested and taken before the court, but instead of doing this they frequently dismiss the complaint, sometimes reprimanding the officer for making the arrest.

Injuries in the shops caused by the men wearing loose overalls and buttoned blouses which catch in the machinery, can be prevented by wearing overalls that fit well and by having the blouse without buttons, drawing it over the head.

In the fall of 1911 the Pa. R. R. Co. appointed safety committees on the different divisions and in the shops. These committees consist of men taken from the different departments, and their duties are to report anything which might cause accidents and to look after the safety of the public and employees. That they have done good work is illustrated by what has been accomplished at the Trenton Shops where the committee was appointed in January, 1912. During April, 1911, among 955 employees there were 208 accidents, or 21¾ per cent. of the entire force of the shops injured. Of course many of the injuries were such that the men were able to return to work as soon as the dressing had been applied by the first-aid attendant. During April, 1914, out of a force of 1,037, 117, or 11¼ per cent., were injured. The committee is not entitled to all the credit for this decrease in accidents. The Master Mechanic has had distributed a pamphlet of "Dont's" and also has cards posted throughout the shops showing the cause and method of prevention of the different accidents.

What has been done in these shops has been done in others.

The principal way to prevent accidents is to educate the men so that they will see the necessity of the precautions which many of them now think to be foolish, the enforcement of rigid rules and by constant supervision.

The moving picture film which will be shown to-night will better explain the various causes of accidents and make a more permanent impression upon your minds than I could ever hope to do in a paper.

THE TREATMENT OF BURNS.*

By E. P. LACEY, M.D., Bessemer, Ala.

The frequency of burns, the pain and discomfort they cause the patient, and the annoyance and anxiety to which the doctor is subjected, is my reason for presenting this paper. In extensive burns it is impossible to keep the patient clean, the odor becomes very offensive, and this frequently creates the impression that the case is not receiving proper treatment.

No one is immune, as neither age, sex, nor condition is spared. The infant and the aged, the rich and poor, the man of leisure as well as the laborer are among the victims of burns.

The old classification of Dupuytren which divided burns into six degrees has been revised by some modern authors who recognize only three degrees, viz: (1) Simple erythema or increased flow of blood to the part; (2) when the burn is sufficient to produce vesication or blisters; (3) when there is complete destruction of the skin and possibly of all the deeper structures.

The effects of burns are both local and constitutional. Some authors divide the constitutional effects into three stages: (1) Shock and congestion; (2) reaction and inflammation; (3) suppuration and exhaustion.

In severe burns the condition is one of profound

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shock. In some cases the shock is so severe the patient does not suffer much pain but complains of being intensely cold and may die in this stage. Shock is not always in proportion to the degree of the burn but to extent of surface involved. Burns of two-thirds of the surface of the body of the first degree frequently prove fatal in infants and the aged. I have never seen a case of burn of the second degree involving two-thirds of the surface recover. It has been ascertained that the blood and urine of burned animals contains toxins which may cause death. This toxic matter is formed by the action of heat on the body cells and fluids at the seat of injury. Heat produces disintegration of red corpuscles with irritation of the kidneys and other organs, this preventing elimination of injurious excretions. If the wound becomes infected death may result from sepsis, while in prolonged suppurative cases it is due to exhaustion.

In burns of the head and face there is danger of inflammation of the brain, in those of the chest inflammation of the lungs may develop, and in those of the abdomen inflammation of the abdominal organs may follow, while duodenal ulceration may occur in any severe burn. Wm. Hunter suggested that duodenal ulceration was probably due to the bile becoming an irritant by the excretion in it of toxic matter. Under antiseptic treatment duodenal ulcer is rarely found.

The treatment of burns is both local and constitutional. In cases of shock the treatment is the same as that for shock due to other injuries. Morphin or opium should be given to relieve pain, and strychnin, whiskey, ammonia, with heat applied to the body, to promote reaction. Atropin is a valuable drug in the cold stage as it renders the patient comfortable and lessens the danger of congestion of internal organs which may prove serious. All organs of elimination should be encouraged to perform their functions, as this may prevent complications. Normal saline solution is a valuable remedy, as it dilutes the toxins, shortens the stage of collapse and promotes free diuresis. Prolonged shock increases the danger from congestion and inflammation of internal organs, hence the necessity of promoting reaction as quickly as possible.

Local Treatment. Biology teaches that under normal conditions waste and repair is a constant process in all organized beings, and when it ceases the organism dies. It is peculiar that the lower the organism the greater the power of reproduction of lost or destroyed parts. Crabs and lobsters develop new claws, and some of the lower order of lizards, new limbs and tails. In mammals and birds, lost members are never regenerated, but "in muscular and glandular organs the tissues destroyed are not properly reproduced, but are replaced by tissues of an irregular kind, which serve to hold the parts together." While we realize our inability to restore lost parts, the question of repairing injuries when we are called upon to treat them is of vital concern, and it is our duty to bring about restoration as speedily as possible. There is one thing we should constantly bear in mind, that drugs do not heal wounds. All they accomplish is to render conditions favorable for the process of repair. From a surgical standpoint the basic principle of this process is cleanliness, or technically speaking, asepsis. This fact is so well established that no one who is familiar with the principles of surgery questions it.

Burns are surgical cases; hence the same general principles which guide us in the treatment of other wounds should apply here. The fact that in extensive burns it is difficult to keep the patient clean, is no justification for using remedies that would not be deemed applicable to other surgical cases.

Residing in a district where burns are of almost daily occurrence I have had an opportunity to try all the remedies I have ever heard suggested. In describing my method of treatment I am aware of the fact that I differ from most authorities and go contrary to the routine which has been followed largely by the profession for fifty years. This does not deter me from adhering to the plan which I think is the better one. I say this in no dogmatic spirit, but with the conviction that authorities are sometimes wrong, as a "brief study of the history of medicine and surgery will reveal numerous revolutions in theory and practice. Many dogmas of to-day believed and given out as medical truths are really no more than theories which may be abandoned to-morrow." This is no reflection on the medical profession, but is strong evidence that it is progressive, that what we seek is truth, and when we find what we have practiced to be wrong we discard it and adopt what science and experience demonstrate is the better plan.

My first endeavor is to get the burn clean. All

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loose fragments of cuticle are cut away, blisters are punctured and the epidermis removed. As long as it remains in place it is a foreign substance that harbors and protects germs underneath if the wound becomes infected. If this is not done the agents used for cleansing purposes or to promote healing never reach the wound. Some authorities suggest leaving the epidermis in place as it may become revitalized, but I have never seen this occur and I have been treating burns thirty-one years. After removing all foreign substances and epidermis I irrigate the wound with 1 to 5000 bichloride or one-half of one per cent. warm carbolic solution. After the wound is clean I dress it with gauze saturated in normal salt solution, as this is the most satisfactory application I have every used. It is inexpensive, clean, has a soothing effect, is an antiseptic and prevents the dressings from adhering to the wound which causes pain when the part is moved, and enables them to be easily removed when the burn requires redressing. I order this dressing to be irrigated sufficiently often to prevent it from becoming dry. It promotes healthy granulations, but if they become exuberant they can be destroyed with a solution of silver nitrate or clipped off with sharp scissors. After all inflammation subsides in burns of the first and second degree, I sometimes use a bland dusting powder of subnitrate of bismuth. If the patient complains of pain when the salt solution is applied I reduce the quantity of salt.

I discarded carron oil years ago. Da Costa says it "allays the pain of a burn, but it is a dirty preparation, and its use is followed by much pus formation," all of which I most heartily endorse. Why there is any more reason for applying oil to a burn than to a wound when the epidermis or true skin has been denuded is incomprehensible to me. No organic substance which is liable to undergo decomposition should be employed. Cleanliness is next to godliness in the treatment of burns if it is anywhere in the practice of surgery. There is risk of sepsis, erysipelas, and tetanus, and we should endeavor to prevent these complications as they endanger the life of the patient. Especial care should be exercised in removing all sloughs as the parts die, and this always occurs in deep burns. It is impossible to tell the depth of a burn from molten iron when it first occurs, hence the necessity for frequent inspection.

Patients should be rendered as comfortable as possible, provided the remedy does not delay recovery. This is very important in working people, for time is a poor man's capital; take this from him and you may rob him of his only available asset. If the skin is destroyed to any extent, skin grafting will facilitate recovery and save time and discomfort. Another advantage is that it prevents the indurated scar which results from burns and is always of low vitality and subject to disfiguring contractions and eczema.

Picric acid is a very good local application, but it stains the tissues and clothing and in susceptible subjects it may produce dermatitis and eczema. Normal salt solution is free from these objections, is absolutely harmless, and is the cheapest remedy one can use, which is an item worthy of consideration. Cheapness alone should never be considered, but when combined with efficiency it is a combination which should appeal to us strongly.

LARVA MIGRANS.*

By A. C. DOZIER, M.D., Ocala, Fla.

I desire to present for your consideration some cases of larva migrans which have been very interesting and instructive to me, not only on account of their comparative rarity and of the form of treatment adopted, but because I believe that I have been able to learn something more about the disease itself —more, at least, than I have found in the books at my disposal. I assure you that any corrections or additions that any of you may care to make will be gratefully accepted by me.

First let me review a few of the case histories:

Case 1. In July, 1913, a little girl, four years of age, was brought to me just after her return from a visit to her grandmother, who resides at Lake Harris in Florida, for treatment of an eruption which the mother thought was "ground itch." It was situated between her toes, but the mother said it had spread in zig-zag lines on the dorsum of the foot, in spite of the home remedies with which she had always cured ground itch before. Having in my library a copy of Jacobi's "Dermochromes," and having only recently looked through all the plates and noted his rather striking illustration of creeping eruptions, I was able to recognize this case at once.

This was my introduction to a disease which was

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destined to become quite common in my practice. Not more than a week had passed when another one of my patients appeared for treatment for another rather refractory case of "ground itch," which the mother was unable to cure.

Case 2. Chester R., a boy, aged seven years, had shortly before returned from a trip to Lake Weir, Florida, and exhibited the characteristic linear, creeping eruption on his toes and instep, which itched intensely. I noted, by reference to Jacobi again, that the treatment "consisted in digging out the animal or in incising the portion of skin in which it is located." Looking the matter up in Pusey's "Principles and Practice of Dermatology," I found the encouraging information that the "treatment consists in destroying the larva, which is difficult because all except the Russian observers have failed to locate it."

I made, therefore, an attempt to locate the larva in the first of these cases and failed; so I determined to make an application and tell the patient to return the next day, thereby gaining time to look the subject up a little more fully. This dressing was applied as follows: First, I painted the entire area covered by the eruption and well beyond the margins with iodine, then applied a wet dressing of bichloride of mercury solution 1-1000, and instructed the mother not to remove the dressing, but to keep it wet with the solution which I gave her, and to return the next day.

That very same afternoon a copy of the *Journal of the A. M. A.* came, containing Dr. Rudell's article describing the method he pursued in recovering the larva in his two cases. So accordingly I procured a good magnifying glass to go after the "bugs" in my case when it returned the next day. Next day, however, upon removing the dressing, I found the entire area was blistered, and the epidermis came away with the dressing. With my magnifying glass I was unable to find anything resembling the larva; but noted the outline of the burrow, which looked like a very shallow tortuous ditch. A simple zinc oxide ointment was applied, and the case was well in a week.

In Case 2 I endeavored to recover the larva according to Dr. Rudell's method, but every time I touched the child with my small cataract knife, he would jerk away, and in fact was apparently so frightened that it was impossible to even inject a little cocain solution, much less open or scarify the burrow; so I applied the iodine and wet bichloride dressing as in Case 1, and secured equally prompt and effective results.

Since the above cases have occurred in my practice I have seen some eight or ten, and in small children I always find it difficult to recover the larvæ, on account of the fright or pain occasioned by scraping or cutting, but have always found the above method certain and easy.

Case 3. T. H., aged about five years, just as in Case 1, had just returned from the seashore. Same treatment, same results.

Cases 4 (R. McK.), 5 (R. A.), 6 (H. D.), were men, in whom it was easy to secure a cure by scraping off the epidermis over the entire burrow, and painting with iodine. The necessity for opening the entire burrow will be shown in Case 9. In Case 6 the larva was recovered by the method of Rudell.

Cases 7 and 8 were not treated or seen by me, but were the patients of Dr. Lane, of Ocala, and are mentioned because one was infected in Georgia and one in Delaware, as I wish to show the wide distribution of this so-called *rare* disease in America.

Case 9. For the privilege of incorporating this case in my report I am indebted to Dr. W. K. Lane, who was the patient himself, and to Dr. A. L. Izlar, who was one of his attending physicians, both of Ocala, Florida. This was the most interesting case known to me that has ever been reported—not from the standpoint of treatment, but because of the instructive facts which we have been able to learn relative to the symptomatology and pathogenesis of this peculiar disease. The history of this case was as follows:

On a Monday in July, 1913, Dr. Lane and family were taking an automobile ride in the evening, when they had a "break down." It was necessary for the doctor to get under the car, and while using gasoline to wash some part, it ran down his sleeve and soaked his coat and shirt. When he arrived home his back was red and covered with many small blisters. These healed rapidly, and the Thursday following he made a trip to Lake Weir, Florida, for the purpose of taking a bath in the lake. Before going into the water, he took his bathing suit by each end and drew it quite a number of times across his back, because he said it made him feel good, but in doing so he left many small raw points where the

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blisters had healed. On coming out of the bath his back began to itch. Next day, Friday, his general condition was such that he had to quit work, and on Saturday he had to go to bed.

This general disorder began on Friday, one day following his bath in the lake, and gradually became worse. The patient had fever, which never reached over 101 degrees. The kidneys, bowels, and skin gradually became less active until their functions were almost arrested. The skin was dry, hot, and yellow, and he was very nervous, and sleepless. The pulse ranged from 120 to 160 beats per minute. Locally on his back and arms there were over 300 points of infection with the larva migrans. The eruption was typical—"long, straight and zigzag and curved lines, a sixth to an eighth of an inch in diameter, often intersecting, but never bifurcating." Itching and pain were intense and described by the patient as like that of a wasp sting. By opening and touching with iodine the advancing end of the line, and the area slightly in front of this point, the line invariably ceased to advance, and the old burrow gradually became less distinct. But about the tenth day, at some point along the burrow, behind the advancing end, a pimple-like formation would appear, and if let alone another burrow would start from this point. By scarifying this pimple-like formation and touching it with iodine the pimple would dry up and no new burrow would result. We naturally concluded that the larva in advancing deposited eggs along the burrow, and made it necessary to scarify or open the *entire burrow* in order to be sure of the complete eradication of the larva.

We therefore believe that we are justified in drawing the following conclusions from the foregoing cases:

First: At least one source of infection is from water, and therefore from other insects besides the bot-fly.

According to Pusey and Stelwagon, Sokaloff and others have succeeded in recovering this larva, and consider it the larva of a "bot-fly, order of diptera, genus gastrophilus." Pusey states that "the means of entrance of the larva into the skin is undetermined, but is probably by the deposit of the ova in the skin by the insect." In looking up the bot-fly in the Americana and other encyclopedias, I find that the "oblong, light yellow eggs are glued one by one to the hairs of the forepart of the body—where they are sucked off" by the animal bitten. If the larva or creeping eruption is that of the bot-fly, it would certainly not gain entrance under the skin by being taken into the alimentary canal, but it seems more probable that there would have to be a point of entrance, and the fly in lighting on the skin might leave one of its eggs on such a point, from contact with the forepart of its body to which the eggs are attached. But if the bot-fly is the source of the larva of this eruption, it does not seem that it can be the only source. In all of Stelwagon's cases, in all of my cases, and also in many instances reported by others, "the malady began at or after a visit to the sea or seashore or a lake." In none of my cases were any of the patients able to recall fly bites or even that they had been annoyed by flies, but all had been bathing or wading in either lake or ocean just prior to the beginning of the eruption. So that it has occurred to me, that probably the larva originates from the *Gad-Fly, Common Horse-Fly,* or *Deer-Fly,* which "attach their eggs to water or wet earth and are carnivorous, feeding on other insects." Might not they also feed, or at least attach themselves, to a bather? And, if a point of entrance, such as that noted in the case of Dr. Lane, or such as is so common on the hands and feet of most children, be present, might it not give rise to the so-called *Larva Migrans?* The case of Dr. Lane (who, as has already been stated, suffered from over three hundred separate points of infection, and who was certaintly not bitten, nor was he in contact with 300 bot-flies), shows conclusively, to my mind, the probability of the water being a source of infection by the larvæ of certain insects, and also the probability of some break in the skin being present for the larva to gain entrance beneath it.

Second: The advancing larva deposits its eggs along the burrow in some cases. This is evident from the fact of a pimple-like formation appearing along the old burrow about ten days after the original infection, and even after the original larva had been recovered or killed. So far as I know this fact has not been observed, or at least has not been recorded in any works at my disposal. It may account for Pusey's statement "that the duration and extent of the wanderings of this larva are indefinite. It usually goes on for several months; in a case of Croker's it continued for two

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and one-half years." It certainly seems possible that the long continuation of the eruption as recorded by Pusey, might have been due to the continuous development of eggs, deposited by the advancing larva in the course of its burrow. At least it suggests the advisability of scarifying or opening the entire burrow, and treating with iodine, to be sure of eradicating the larva in many cases. It is a fact that "some larvæ among insects may breed, by a phase of reproduction called parthenogenesis, a method of reproduction in which eggs develop without impregnation—instances are abundant in insects, rotifera and lower crustacea."

Third: A person may be infected by any number of larvæ. Stelwagon states that "exceptionally, there is more than one parasite present (rarely more than two)." The case of Dr. Lane, who had more than 300 separate points of infection, shows the possibility of any number of infections, depending, I believe, *on the presence on the body of the patient of many points of entrance.* Dr. Lane, by the irritation of his back with his bath suit, caused many minute denuded areas, which were the points of entrance for the larvæ in his case.

Fourth: When a patient is infected by a large number of larvæ there may be a marked and extreme toxemia. I find no mention of this in any works available to me. Dr. Lane's pulse, temperature, blood, and secretions did not become normal until all larvæ were destroyed. His weight decreased from 201 pounds to 148 pounds in two weeks.

Fifth: Creeping eruption is more common than has been taught. All authorities begin their articles by stating that larva migrans is a rare disease in the United States, yet our cases were from Delaware, Georgia, and Florida; Dr. Rudell's were in North Dakota; Dr. Stelwagon's four cases were, I presume, in or around Philadelphia, and Dr. Morehead reported five cases in the *Texas Medical News* in 1906.

Sixth: In children with small areas involved, who from fear, temper or inability to stand pain will not permit scarifying or opening of the burrow, the treatment with iodine and wet bichloride of mercury dressing as directed, is *Sure, Safe,* and *Prompt.*

Treatment by freezing with ethyl-chloride and by the use of chrysarobin ointment or painting the area covered by the eruption and well beyond the edges with chrysarobin in collodion has been used successfully.

CLIMATE AND MORBIDITY.*

By E. C. BRIGGS, M.D., Wilmington, Ohio.

Neither the title nor the subject matter of this paper comports well with the program of a surgical meeting; yet I hope I can offer some excuse for occupying your time. That there exists some relation between certain types of acute illness and sudden climatic changes is apparent to every practitioner of medicine. Climatologists tell us that in the temperate zone two climatic areas are recognized, one following the other and moving with the prevailing wind. One, a high pressure, and the other, a low pressure or cyclonic area.

The influence of these respective areas on the physical well-being of the inhabitants of a country is very evident. The high pressure area is exhilarating with an element of buoyancy in it, while the low pressure area carries a higher temperature, a greater degree of humidity, and has a corresponding enervating and depressing influence. It is during the passage of a low pressure or cyclonic area that many persons, in addition to suffering the ordinary discomforts incident to low pressure, develop a physical state which terminates in an acute illness with the advent of the cooler high pressure area which follows.

It is evident that low pressure and humidity are not the only factors in developing this physical state, because all persons do not fall ill with the passage of a low pressure area, nor do those who are subject to such attacks always become sick. A third factor must be sought, and I believe can be found in the sanitary condition of the alimentary canal. How many of the aches and pains complained of during the passage of a cyclonic area are due to a changed pressure equilibrium, and how much can be placed to the credit of bacterial toxins or chemical by-products from a perverted metabolism, I do not know. That these conditions are found goes unquestioned. It seems like this—the sanitary condition of our alimentary canals depends upon our dietetic habits; the low pressure area favors the development of bacteria and the accumulation of tox-

* Read before the third joint meeting of the Railway Surgeons' Associations, Pennsylvania Lines East and West of Pittsburgh, June 19 and 20, 1914.

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ins in the blood, when the impact of a cooler, high pressure area unbalances the eliminative function which precipitates an acute illness.

Just how and why these climatic changes are followed by an acute disorder has not been determined. It is further evident that climate is not the only factor, because some persons are susceptible at one change and escape any deleterious effects at another. A predisposing and an exciting cause will be found in every case of ill-health, and that in many acute ailments the predisposing cause is a systemic state present in the alimentary canal, and the exciting cause is a climatic disturbance, I think I have verified to my own satisfaction many times. I do not think a person will be attacked with colds or any acute infection when his metabolic and excretory functions are well balanced. No one probably has lived from childhood to old age without at some time in his life suffering with what is commonly known as a bad cold.

That a clean normal state of the alimentary canal means freedom from bad colds I have time and time again demonstrated to my own satisfaction. That what are called colds or a bad cold is an infection, or culminates in an infection, is commonly accepted; and it is probable that all acute infections are general or systemic or blood infections early and later develop into a local infection, as a pneumonia, by virtue of that affinity or predilection which bacteria have for certain special tissues of the body. If climatic vicissitude can break down the barriers to infection and admit one species of germs, as in a coryza, why can it not pave the way for any or all pathogenic organisms present to enter the system. If this assumption is true and an individual has present in his system these predisposing conditions and at the same time the pneumococcus becomes lodged on some mucous membrane, the mine will have been laid for an attack of pneumonia, and all that is required is the match in the nature of a climatic vicissitude to set it off. If the individual is injured and has a clean alimentary canal, that is, if the balance between metabolism and excretion is normal, repair will rapidly take place, while on the other hand, if these functions are unbalanced and his alimentary canal is foul and unclean, repair will be tardy and delayed and infection of the wound will take place from within, if not from without.

You will note that I have assumed in this paper that infections take place only when there exists a definite physical state, and that is found in the alimentary canal. If this assumption is true, we are liable to infection whenever exposed with a foul alimentary canal, and we only escape because of the absence of the infecting bacteria. Probably Wright's opsonic index is high when the alimentary canal is clean and low when it is foul.

I received a circular letter from the Chairman of the Publicity Committee of this Association calling our attention to the importance of having at hand the best first aid dressing for open wounds. His reasons for this were two: First, for the good of humanity; second, that the surgeons of the great Pennsylvania Lines should be second to none in their care of the injured. This circular letter calls our attention to the very excellent results following the direct application of tincture of iodin to all wounds subject to infection. I gladly acknowledge its merit; but this paper does not deal directly with external wounds, but is a feeble plea for strengthening the body defences against infection by keeping the *inside clean*. It may be presumptive for me to say that I do not believe grave infections will take place in a person with a clean alimentary canal. The remedy is temperance. I do not mean in the use of alcohol alone, but in every habit and function of life. You all well know that in metabolism the liver is the principal agent; in elimination, the kidneys and bowels. So long as the functions of these organs are well balanced the organism is safeguarded; let one or more of them fail in action and the body defences will be weakened to a point that will admit the bacterial hosts into the system. It is held by our ablest authorities that from the intestinal canal, by absorption, come nearly all the irritating toxins which injure the kidneys and liver and bloodvessels; and that it is only by keeping the alimentary canal clean that we can prevent these changes taking place. The remedy is a temperate habit of eating and drinking, working and sleeping. It is probable that our greatest error is in eating too much, eating too much nitrogenous food, and the use of alcohol as a beverage. Our motto must be, if we would do justice to our bodies and attain our greatest efficiency, temperance in all things, or as was said by one of the wise men of Greece, by avoiding excesses.

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REPORT OF THE 20TH ANNUAL MEETING OF THE ASSOCIATION OF SURGEONS OF THE SOUTHERN RAILWAY.

From every point of view the 20th annual meeting of the Association of Surgeons of the Southern Railway, held at the New Battery Park Hotel, Asheville, N. C., June 2nd to 5th, will rank as one of the most successful in its history.

Although for various reasons the attendance was not as large as at Washington last year, the interest displayed at the different sessions was all that could be anticipated.

A large number of practical and instructive papers were presented and discussed in detail.

The meetings were ably presided over by the President, Dr. H. T. Bahnson, with the co-operation of the Vice-Presidents.

As usual, Dr. J. U. Ray, Secretary and Treasurer, demonstrated his efficiency, and to his efforts is due much of the success of the meeting.

While most of the time was devoted to the scientific sessions the social features were not neglected.

Wednesday evening was devoted to an informal entertainment in the nature of a mock operation and a trial for malpractice by a jury of ladies chosen from the audience. Dr. S. R. Miller demonstrated his skill in operating and removing various foreign bodies from the abdomen of the patient, Dr. J. U. Ray. This impromptu entertainment evoked much merriment and applause because of the wit and humor displayed by Dr. Lane Mullally, who officiated as judge, Dr. W. W. Harper, counsel for plaintiff, and Dr. Hugh Blair, counsel for the defendant, as well as the clerk of the court, Dr. Davies, and the jury themselves, and contributed much to the evening's enjoyment.

Thursday afternoon a very enjoyable drive was tendered to the ladies and children and members around Asheville, including a visit to the beautiful Vanderbilt estates (Biltmore Farms).

The crowning feature of the various entertainments provided was the enjoyable trip to Lake Toxeway, made possible by the generosity of the Southern Railway at the incentive of Chief Surgeon W. A. Applegate, on Friday, the last day of the convention. This excursion to the beautiful artificial lake and hotel grounds amidst most picturesque scenery will be vividly remembered by all who had the good fortune to participate.

The writer takes this occasion to pay tribute to the hospitable and courteous spirit evinced by the management of the New Battery Park Hotel to the visiting members of the Association. The accommodations and cuisine were all that even the most fastidious could desire.

The award of prizes offered by THE INTERNATIONAL JOURNAL OF SURGERY for the four best papers presented at this meeting was under the charge of a special committee of which Dr. E. G. Givan was chairman. Their decision was as follows:

The first prize, consisting of an instrument cabinet, manufactured by the W. D. Allison Company, of Indianapolis, was awarded to Surgeon W. Earle Drennen, of Birmingham. The second prize, consisting of a surgical chair, manufactured by the Max Wocher & Son Company, of Cincinnati, Ohio, to Surgeon-Oculist T. W. Davis, Winston-Salem, N. C. The third prize, consisting of a complete vaccine outfit, manufactured by George Sherman, M.D., of Detroit, Mich., to Surgeon-Oculist H. H. Briggs, of Asheville, N. C. The fourth prize, consisting of a complete set of hand-forged knives, manufactured by the E. Schmid Company, of Indianapolis, Ind., to Surgeon E. P. Solomon, Birmingham, Ala.

Chattanooga, Tenn., was selected as the next place of meeting; date to be announced later. The following officers were elected for the ensuing year: President, Dr. Lane Mullally, of Charleston, S. C.; first vice-president, Dr. B. M. Tittsworth, of Jefferson City, Tenn.; second vice-president, Dr. Stephen Harnsberger, of Catlett, Va.; third vice-president, Dr. H. H. Briggs, of Asheville, N. C.; fourth vice-president, Dr. W. H. Hutchinson, of Childesburg, Ala.; secretary and treasurer, Dr. J. U. Ray, of Woodstock, Ala.; member of the executive committee for term ending in June, 1920, Dr. Jay H. Durkee, of Jacksonville, Fla.

Percy Treatment of Inoperable Uterine Cancer.—Dr. T. O. Burger (*South. Calif. Pract.*, April, 1915) makes a plea for this treatment in advanced cases of cancer of the uterus when radium is not obtainable. It consists essentially in the application of low heat to the cancerous mass, insufficient to cause charring. The heating iron is controlled by the rheostat and is not allowed to become hot enough to color or cause an odor when applied to absorbent cotton. It is passed through a water-cooled speculum into the mass or through the cervix if there is a corporeal growth.

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Surgical Gleanings

Radium Treatment of Fibroid Tumors.—Dr. Howard A. Kelly (*Surg., Gyn. and Obst.*, March, 1915) reports on the results obtained with radium in 36 cases of uterine fibroids. The method of treatment employed has been a dilatation of the cervix and the introduction within the uterine cavity of amounts of radium varying from 30 to 724 mg. From his experience he is inclined to believe that massive radium treatment of uncomplicated fibroid tumors is the best plan, as it stops the excessive flow; sometimes in younger women it regulates it without stopping it. The tumor is reduced in almost every instance, pressure symptoms relieved, even large tumors caused to disappear. If radium is tried and fails the operation can then be undertaken without any added risk. In the author's opinion, it will be possible, with increased experience and improved technic, to relieve every patient of hemorrhages, and in most cases to do away with the tumor (roughly speaking, in 9 out of 10), and that without serious discomfort, risk or confinement to bed for more than one or two days. Patients too anemic and weak even for an intra-uterine application of radium can be treated through the abdomen exclusively.

Treatment of Hemorrhoids under Local Anesthesia.—Dr. C. J. Drueck (*Med. Brief*, Apr., 1915) states that practically all uncomplicated cases of hemorrhoids may be operated upon under a local anesthetic. One of the cardinal reasons for using local anesthesia is to interfere as little as possible with the patient's continuing his regular duties, and therefore too much must not be attempted at one time. Where several hemorrhoids are to be removed, it will require several sittings. Only one or two should be removed in one day. A local anesthetic has a distinct advantage in aged, timid or nervous patients, but it should be used only in cases where the tumor can be brought outside or the anus is patent. Internal hemorrhoids, bleeding and painful and demanding operation but not protruding to any extent, cannot be satisfactorily removed under a local anesthetic, because the very first step in the treatment is careful but thorough dilatation of the sphincters, and that is impossible without a general anesthetic. If the anus is patent, or if the upper limit of the base of the pile can easily be reached without much stretching, you may operate under cocain, but if the pile is large, the patient should rest in bed for a couple of days. Where only one or two piles are present the operation may be performed in the office and the patient sent home after a little rest, but in aggravated cases, where a large area is involved or where the bloodvessels are atheromatous, the work should be done at the patient's home or at a hospital.

Conservative Use of Lane Plates.—Dr. E. K. Green (*Jour.-Lanc.*, May 15, 1915) says that there are four points which are absolutely essential for the attainment of good results in the application of Lane plates for the treatment of fractures. These are: 1. Lane's aseptic technic. Although it is difficult to maintain, all men of experience seem to be united as to its importance, and our aim in that respect should be *absolute perfection*. 2. The plates should be put in with the minimum amount of trauma, the incision being such, and the instruments of such kind, as to allow manipulation of the fragments without tearing the muscles or unduly stretching or pulling the nerves and blood-vessels. 3. The fragments should be accurately placed in position by the proper instruments; and sufficient hardware should be used positively to hold them where they belong. 4. The principles of osteogenesis, as laid down by Dr. J. B. Murphy, as regards the periosteum, the autograft or bone-graft, and the manipulation of the parts, should be remembered and respected throughout the entire course of every case which comes to operation.

The Lorenz Method in Congenital Luxation of the Hip.—Dr. W. Boecker (*Deut. med. Wochenschrift*, No. 19, 1915), who has employed this method in hundreds of cases, expresses the conviction, that if resorted to at an appropriate age, it will cure almost all cases of unilateral luxation and about two-thirds of the bilateral.

Indications and Contraindications for Abdominal Cesarean Section.—Dr. Ross McPherson (*Provid. Med. Jour.*, May, 1915) summarizes his views in the following conclusions: First. Cesarean section is a very useful operation for removing the child from a pregnant woman at or near term in cases: (a) where there is a relative disproportion between the birth canal and the fetus, sufficiently large to make the birth difficult or impossible; (b) in cases of serious obstruction due to tumors, or deformities congenital or acquired; (c) a certain number of cases of placenta previa, convulsive toxemia, or occasionally organic disease. Second. The operation should not be decided upon except by a person whose training and experience in pelvic and abdominal examination is sufficiently large to warrant the acceptance of his judgment. Third. The operation should not be performed by anyone unless he be a skillful abdominal surgeon, preferably one who has given particular thought and attention to this subject. Fourth. A long labor, much handling and manipulation, especially in the presence of ruptured membranes, predispose the patient to infection of the peritoneal cavity, and fifth, therefore, intraperitoneal abdominal Cesarean section should not be undertaken under those conditions, with one exception, namely when the religious prejudices of the family demand the saving of the child at the expense of the mother, and then only in the presence of and with the advice of a consultant and a clergyman, after carefully explaining the situation to the family and obtaining their written consent to the procedure. Sixth. If the above demands and conditions are fulfilled the maternal mortality should be practically nothing, the morbidity negligible, the end result perfect, and with the exception of those cases undertaken solely in the interest of the mother, every child should be born alive.

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Original Articles

Cancer Campaign

THE CONSERVATION OF THE HUMAN BREAST: A CONTRIBUTION TO THE PREVENTION OF CANCER.

By William Seaman Bainbridge, A.M., Sc.D., M.D., C.M., New York.

Enthusiasm wisely directed and rationally controlled is a potent factor in the success of any undertaking. In the campaign of education concerning cancer it is a grave question whether enthusiasm has been uniformly wisely directed or rationally controlled. It is well, therefore, to take an accounting of stock occasionally in order to see just wherein we may have erred. The purpose of this paper is in line with such an accounting, and is intended to emphasize some of the pitfalls which have been noted to date in one direction—the conservation of the human breast. It is safe to say that no organ or part of the body has figured more conspicuously in the literature of the crusade against cancer than has the breast.

I have cited elsewhere* the fact that 757 cases of new growths in the London hospitals from 1904 to 1909, treated as cancer, proved, upon microscopic examination, not to be suffering from that disease. Of these 757 (out of a total of 9,488 entered as cancer) 438 were accessible tumors, tumors on the surface of the body, or in parts accessible to external examination. From such figures it is fair to assume that similar mistakes in diagnosis are not uncommon in the case of the breast.

I have no figures available to show the proportion of malignant tumors of the breast treated in the beginning as benign growths, but those who observe large numbers of patients afflicted with cancer know the distressing frequency with which they are called upon to operate in cases of advanced cancer with a history of the neoplasm having been pronounced "harmless" by one or more physicians at the time when it was easily removable, and hence curable.

It is, however, to the first category that I wish to call particular attention, in order to emphasize a timely warning against the hyperenthusiasm which has been manifested by some who have participated in the campaign of education against cancer. One expression of this hyperenthusiasm repeatedly uttered by prominent surgeons, before mixed audiences of laymen and physicians, is to the effect that "within twenty-four hours after a lump is discovered in a woman's breast, that breast should be removed." Many versions of this statement have been made by "cancer campaign" enthusiasts, which have tended to reduce it to the category of a "slogan" or war cry. If followed indiscriminately, many a woman would go through the remainder of life unnecessarily mutilated, and not a few hampered by the direful mental hazard which such a mutilation is almost sure to create. Such a woman at once becomes, in her own mind, foredoomed to recurrence and to ultimate death from cancer, whether the tumor removed was or was not cancer. For we must not forget that while we are educating laymen with reference to the prevention of cancer, we are at the same time enlightening them concerning the dangers of the disease, its frequency, its clinical course, its signs and symptoms, perhaps, and many other matters whose dissemination is of decidedly questionable wisdom at this stage of our own knowledge—or lack of knowledge—relative to this malady of misconception. The woman, so enlightened, is duly impressed with the horrors of the disease, and when she finds herself marked for life by the absence of a breast, removed for "cancer," she must be indeed a very level-headed and

* Bainbridge: "The Cancer Problem," 1914, pp. 195-196 (quoted from Bashford, in the *Lancet*, London, Sept. 4, 1909, II, p. 691).

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well-poised woman who does not invest at times with reality in her own person the horrors of which she has read or heard, or which, perhaps, she has seen pictured on the screen or elsewhere.

It behooves us, therefore, to bear in mind: (1) that causes, other than malignancy, may give rise to tumors in the breast; (2) that some of the so-called characteristic and classic signs of cancer, such as retraction of the nipple, elevation of the breast, and pain, may exist entirely independent of malignant involvement; (3) that by more careful diagnosis unnecessary mutilation may often be obviated; (4) that certain special surgical principles should be employed in operating upon the breast if the prevention of cancer is to be fostered.

The following cases, which might be multiplied many times, are illustrations of these contentions:

Local manifestations of other diseases are always to be thought of in connection with tumors of the breast, notably tuberculosis, syphilis, Hodgkin's disease (pseudoleukemia), and chronic intestinal stasis. It has long been known that the breast may be the seat of tumor formation in certain "systemic" diseases, as well as in "specific" affections, and yet it is by no means unusual for practitioners to refer patients to surgeons for removal of the breast in cases which are amenable to treatment by other means, and in which such surgical intervention would entail unnecessary mutilation.

Case I. *Syphilis.* P., married, 38 years of age when referred to me, November 21, 1910. The patient gave a history of having been always well and strong until two years before, when she began to have pain, more or less continuous, to the right of the sternum, at the upper part of the right breast. Examination showed enlargement of the sternal ends of the second, third and fourth ribs on the same side. This was verified by x-ray examination, according to which the pleura and lung were not involved, and the bone changes were not sufficiently characteristic to justify stating whether this was sarcoma or some benign growth. Wassermann and Noguchi tests both proving positive, the patient was placed on mixed treatment of potassium iodid and proto-iodid of mercury, with the understanding that if improvement was not satisfactory salvarsan would be employed. This treatment was continued, under the supervision of her physician, for a year. There was improvement in the pain, and the growth in the chest wall decreased slightly, for a time, then remained stationary. Salvarsan was then administered, intravenously, and followed by the mixed treatment. On May 1, 1915, her physician reported that, under the mixed treatment continued for the requisite time, the growth had entirely disappeared, the pain had ceased, and she had been well ever since.

In this case, with a growth apparently in the upper quadrant of the breast and involving the ribs, the diagnosis of malignancy was certainly to be considered, but operative interference, as suggested by one physician consulted, would have been worse than useless.

The following case is an illustration of the possibility of mistaking circumscribed manifestations of Hodgkin's disease for cancer.

Case II. *Hodgkin's Disease.* N., married, 32 years of age. Admitted to the New York Skin and Cancer Hospital, April 3, 1915, with the following history: About two years ago she first noticed an enlargement of the thyroid gland, and about a year ago a tumor appeared on the right side of the neck, and another at the upper and outer margin of the right breast, extending into the axilla. Six months before admission to the hospital a piece was taken from the tumor in the neck, at a hospital in a neighboring city. The report was lympho-sarcoma.



Fig. 1. Case 2.

Operation was not advised by the physician in charge, the condition being considered too far advanced for surgical intervention. The patient, growing steadily worse, entered the New York Skin and Cancer Hospital on her own initiative, to see if something could not be done for her. The condition at that time was as shown in Fig. 1. On April 5, 1915, some of the tumors were excised, and radium applied. The pathological report, by

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Dr. D. Stuart Dodge Jessup, was Hodgkin's disease.

Within the last few years a new significance has been given to certain "lumpy" conditions of the breast which were formerly neglected entirely, removed by surgical intervention, or treated with suspended judgment pending further developments. Latterly, Sir W. Arbuthnot Lane, of London, has cleared up the subject by demonstrating in a number of cases that the lumpy condition disappears after the patient is relieved, by surgical or non-surgical treatment, of the chronic intestinal stasis of which the breast condition forms a phase. The following case illustrates this class of breast tumors, which may be easily confounded with cancer, particularly in view of the emaciation, sallow skin which may resemble cachexia, and general debility, so often the concomitants of both stasis and cancer.

Case III. *Chronic Intestinal Stasis.* H., single, 41 years of age. Referred by Dr. C. N. Skinner, Port Jervis, N. Y., May 27, 1914, for diagnosis. According to the history, this patient, a year before, had begun to have pain in the right breast, sometimes sharp and stinging, and worse at night. She complained of a sensation of the right breast being "drawn up." For a number of years she had, at times, pain in the right side, in the neighborhood of the appendix; also pain in the stomach, coming on very suddenly, and accompanied with such abdominal distension as to necessitate removal of the clothing. Otherwise she felt well. Examination showed both breasts to be dependent and "lumpy," the right being considerably larger than the left. The diagnosis was made of chronic appendicitis, chronic intestinal stasis, and "stasis lumps" in the breasts. A support for the breasts, the removal of the appendix, and the correction of any other abdominal conditions that might be found at laparotomy, were advised. The patient had been treated by different physicians, with various applications to the breasts and different forms of supports. Several surgeons had advised amputation of the right breast. Laparotomy, performed by Dr. Skinner, upon my advice, June 17, 1914, with the following findings: A small ovarian cyst, right side; appendix adherent to ileum; ileo-pelvic (Lane's) band, causing ileal kink; parieto-colic membrane ("Jackson's veil"); bands between ileum and cecum. Appendix removed, bands cut transversely and sutured longitudinally, cystic ovary removed. The patient made an uneventful recovery, and has since steadily improved in health. On March 11, 1915, Dr. Skinner reported that the "lumpy" condition in the breasts had disappeared, the right mammary gland having decreased to almost the size of the left.

This is one of a considerable number of cases in which I have observed complete disappearance of apparent tumors in the breast following treatment for chronic intestinal stasis. In all cases of this lumpy condition in the upper and outer quadrant of either breast—more often the left—chronic intestinal stasis must be ruled out by weight of evidence before a diagnosis of cancer is made and removal of the lumps or of the breast advised.

Local conditions (non-malignant), which, not properly cared for, may become malignant. There are so many unsolved problems connected with cancer, and so many theories proposed concerning its cause, that one would hesitate about repeatedly directing attention to any given presumptive factor in the initiation of this disease, were it not for the gravity of the situation and for the desire to emphasize the importance of being always on the side of safety. From this point of view, therefore, too much stress cannot be placed upon the care of the breast, especially, perhaps, the nipple, when it is the seat of any affection which is apt to leave cicatricial tissue. The breast, by virtue of its position and function, is particularly subject to trauma and chronic irritation. If we accept as true the findings of modern research institutions, as well as of clinicians, with reference to the frequent correlation between cancer and irritation within the tissues or from without, we should make an especial point, in practice and in precept, of safeguarding the breast as a whole and the nipple in particular. The nipple is strategically placed. Infection in any part of the breast itself will not necessarily affect the entire organ, but if it involves the nipple it is very apt to do so. It is a grave question whether a young woman of the child-bearing age, whose nipple is destroyed, whose gland ducts are entirely blocked at their outlet, is not in the same category with the woman approaching the menopause with her breast largely scar tissue. It is a question whether it would not be better to remove the breast in either case, particularly in that of a child-bearing

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woman. Such a procedure may prove to be in line with conservative surgery as regards the preservation of life.

In this connection I wish to voice an earnest protest against the continued application of the term Paget's disease to conditions of the nipple. Paget's disease is described as "malignant papillary dermatitis, characterized first by an eczematoid process," affecting the nipple and areola. It would be more safely considered, it seems to me, as beginning cancer. We have at our command absolutely no means of determining the line of metamorphosis from the "eczematoid process" into the "malignant papillary dermatitis," and from that into the profoundly malignant carcinoma. A malignant process starting in the nipple may become diffused throughout the breast by extending along the ducts in all directions and be far advanced before its true nature is discovered. The condition is either eczema or cancer, and to consider something between the two as an entity is unwise and most misleading. Every case of eczema of the nipple, therefore, should be under serious suspicion of malignancy. The following case illustrates certain points in this connection.



Fig. 2. Case. 4.

Case IV. *Eczema of the Nipple.* K., unmarried, 26 years of age. Condition when first seen by me, May 6, 1915, was as shown in Fig. 2. She had a lumpy and painful condition of the right breast, due to a pyogenic infection from the eczematous ulcer. Because of the ulcer at the nipple, the condition of the breast, and enlargement of the axillary glands, she was sent by her physician to the hospital for removal of the breast for carcinoma. A few days of treatment caused complete disappearance of the eczema. If, however, in a case like this there is a certain amount of cicatricial contraction the gland ducts become obstructed, trouble may follow, necessitating in many cases removal of the breast. If the condition clears up under treatment within a reasonable time the diagnosis of eczema may be confidently made. If it persists, if there is induration and a good deal of scar tissue, the breast might as well be removed. Removal of the nipple alone, as a rule, is unwarranted. When a part of the breast is exsected, that entire part which is drained by the ducts in the vicinity should be excised.

In such a case, even if the eczema could be checked before malignancy has supervened, cicatricial contraction sufficient to block off all the gland ducts in the nipple might occur. In a young woman of child-bearing age such a breast is at least potentially malignant, and the chances are strongly in favor of its becoming actually so. Even granting that the "eczematoid process" has not obliterated all the ducts, or that they are only partially blocked, child-bearing might be attended with such retention of milk as to lead to acute mastitis, abscess formation, or chronic mastitis—conditions strongly conducive to malignancy. In at least some such cases conservatism is on the side of the removal of the breast.



Fig. 3. Case 5.

Another condition which may be mistaken for cancer, and which calls for seemingly radical but in reality conservative surgery, is chronic abscess. The following is a case in point.

Case V. *Chronic Abscess.* L., married, 26 years of age, Turkish by birth. Admitted to the New York Skin and Cancer Hospital April 3, 1914, the condition at this time being shown in Fig. 3. The abscess had been opened in Turkey, nine weeks

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previous to admission to the hospital. Examination showed a hard, discharging mass in the neighborhood of the nipple. The nipple was retracted, the breast was drawn up, and the glands in the axilla were enlarged. The breast was painful.

The abscess, in this case, involving the nipple, either had implicated, or was in fair way to do so, the entire breast. The extent to which the infection had already involved the breast could not be determined. This patient, of child-bearing age, with so much scar tissue around the nipple as the abscess had already caused, and would cause, was in danger of cancer. The nipple was both retracted and contracted by the cicatricial tissue. The gland ducts were completely blocked, so that it would have been impossible for milk to escape in the event of another pregnancy. Conservation of life, therefore, demanded removal of the breast.

According to the old idea of treating abscess of the breast the important thing was to make a num-



Fig. 4. Case 6.

ber of free openings about the organ, as well as in the abscess itself, and to apply ice. The multiple incisions of the breast involved the production of a great deal of scar tissue, and the result was a largely damaged breast, with blocked ducts, and scar tissue apt to be subjected to irritation—the best possible soil for the production of cancer. The tendency, at the present time, is to find the place in the breast where the pus is nearest the surface and thoroughly drain through as small an incision as possible. Often the retained and thickened milk, looking so much like pus, is mistaken for it, and more damage done to the mammary gland than necessary. Conservative surgery with systematic massage and topical application of cold saves many a breast from extensive mutilation.

Case VI. *Acute Abscess.* M. R., 32 years of age, married, mother of nine children. Admitted



Fig. 5. Case 6.

to the New York Polyclinic Hospital, April 6, 1915, with the condition shown in Fig. 4. The abscess was incised and the cavity thoroughly cleansed. Fig. 5 shows the condition after operation, and Fig. 6 the condition one month later.

In such a case there is no reason to anticipate cancer as the outcome of this abscess, yet the old-time method of treatment might easily have rendered the patient a probable subject of cancer. It is important in all such cases to place the incision

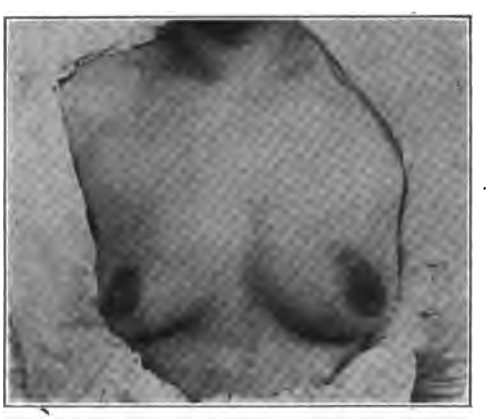


Fig. 6. Case 6.

so that the resulting scar will be as little subject to irritation as possible.

Case VII. *Furunculosis.* W., 18 years of age, colored. Admitted to the New York Polyclinic Hospital March 4, 1913, with the condition shown

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in Fig. 7. There were numerous small furuncles around the nipple and areola. They were not deep infections, but had already produced some scar tissue, and would undoubtedly cause a good deal more to form if not carefully treated. The blocking off of the gland ducts would be the logical result, and in the event of child-bearing, abscess formation would be a virtual certainty. The condition, therefore, was one of potential malignancy. This condition had been diagnosed as cancer and amputation of the breast advised. But by careful attention to the abscesses, opening and cleaning them out with antiseptics, it was possible to restore the breast to good condition. However, in view of possible blocking of the gland ducts, such a breast should be kept under observation.



Fig. 7. Case 7.

Chronic Irritation. A part of the campaign of education with reference to cancer should be directed to the correction of certain errors in dress which bring about conditions favorable to the development of cancer. One of the most common sources of evil in this connection is the corset. A large proportion of women wear corsets which are neither high nor low, but which come just high enough for the breast to impinge upon the top of the corset, especially when the wearer leans over. There is thus more or less constant irritation not only of the skin but of the breast tissues. Sometimes, as in the following case, the initiation of the malignant process seems definitely traceable to this long-continued irritation.

Case VIII. *Irritation by Corset.* H., aged 53. Consulted me April 27, 1915. Fig. 8 shows the condition found under the right breast, caused by the constant friction of the corset steel. In the inner, lower quadrant of the breast was a small tumor. The nipple was retracted. The right breast was higher than the left. The ulcerated area shown in the picture was about as large as a silver quarter. The axillary glands of the right side were enlarged. Radical operation was indicated and performed.

Precancerous (Non-malignant) Tumors. The significance, diagnosis, and treatment of benign neoplasms of the breast suggest many points of interest in relation to the conservation of the breast and the prevention of cancer. Many times nodules of this character, plainly not the outcome of chronic intestinal stasis, or of any of the conditions above mentioned, may be considered precursors of cancer.



Fig. 8. Case 8.

Sometimes it is feasible, when the nodules are small, and when only one or two are present, to remove these, saving the rest of the breast. In other cases, where multiple nodules are disseminated throughout the substance of the breast, the only conservative course is removal of the entire organ.

In such cases the contour of the breast should be preserved as nearly as is possible. This is particularly desirable in women accustomed to wearing evening gowns. This may be accomplished, in some instances, by taking a pad of fat from the side, bringing it over, and suturing it under the skin over the breast. It is sometimes necessary, in doing this, to put in free drainage for a time, as there may be a little breaking down of fat. As a rule, however, there is no trouble, and the patient is spared the deformity consequent upon the removal of the breast. Illustrative cases follow:

Case IX. *Multiple Chronic Inflammatory Nodules.* A., 36 years of age, consulted me January 15, 1913. Both breasts presented a nodular condition

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which failed to respond to non-surgical treatment, and which was sufficiently extensive to warrant removal of the breasts. This was done, by conservative operation, as shown in Fig. 9. By this curved incision, along the lower and outer margins of the breasts, it was possible to leave intact the nipples and the skin, and, by lifting this up, to remove the entire gland tissue, leaving all the fat in the upper

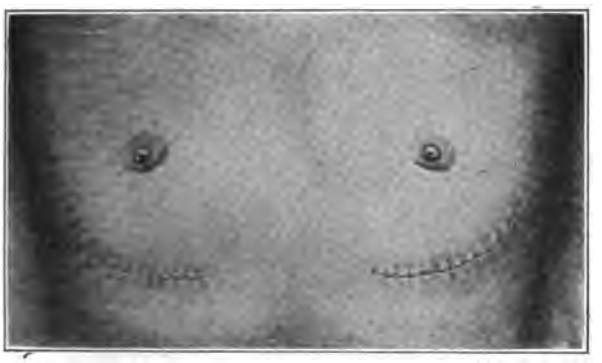


Fig. 9. Case 9.

part. By using this fat as a pad, the configuration was preserved. Pathological examination confirmed the diagnosis.

Case X. *Fibro-cyst-adenoma.* C. consulted me in January, 1914, on account of multiple tumors in the left breast. Operation at the Alston Private Hospital, January 28, 1914. By a semi-circular incision under the breast, as shown in Fig. 10, the

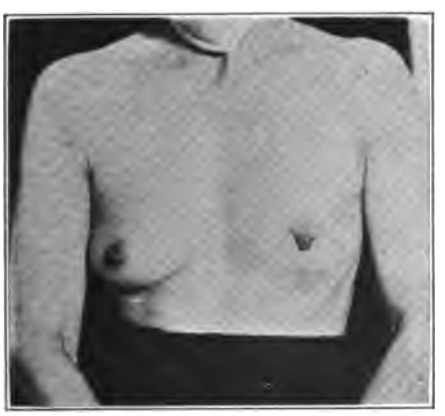


Fig. 10. Case 10.

nipple and skin, left intact, were turned up and the breast dissected out. Examination by frozen section, made by Dr. D. S. D. Jessup, proved the nodules to be fibro-cyst-adenoma.

When a tumor of such size and appearance as to warrant saving the breast is situated in the upper part of the gland, it may be removed, if not too deep, through an incision around the areolar margin, and continued, if need be, for a short distance radially in whatever direction the location of the tumor renders necessary. This is illustrated in Case XI.

In dissecting out a tumor it is always to be borne in mind that the entire section drained by the ducts supplying the part in which the tumor is situated



Fig. 11. Case 11.

is to be removed. If the milk ducts are cut across, and the remaining occluded portions are left *in situ,* trouble will be very apt to follow.

Case XI. *Adeno-fibroma.* C., single, 19 years of age. Admitted to the New York Polyclinic Hospital March 22, 1915, for removal of tumor of one year's duration in right breast. There was no vis-



Fig. 12. Case 11.

ible tumor, as will be seen from Fig. 11. The nipples were on a line, and neither was retracted. When the breast was held, as shown in Fig. 12, a tumor became apparent. This proved to be about the size of the half of a hen's egg. It was just beneath the skin, freely movable. No enlargement of glands. Through an incision circumferential to the

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nipple, as shown in Fig. 13, the tumor was removed, leaving the glands and ducts in continuity. The tumor, actual size, is shown in Fig. 14.

With careful coaptation of the skin wound no external scar is left in such a case, and if the glands and their ducts are left intact, no scarring in the breast substance is left to cause future trouble. It

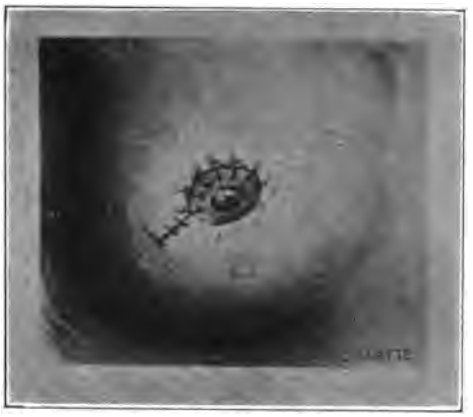


Fig. 13. Case 11.

is important in such cases to have absolute hemostasis, in order to prevent the possibility of a hematoma. In a young woman it is important to save the glands and ducts if possible. No deep stitches, except in the capsule, should be taken in such a case, as, in drawing the



Fig. 14. Case 11.

tissues together, there may be a blocking of some of these ducts.

Case XII. *Lipoma.* S., married, 35 years of age. Referred by Dr. T. T. Gaunt, October 21, 1914. About ten months before this the patient fell, catching her right arm on the top of a chair. She became "black and blue" where she was struck, and about eight weeks later a lump appeared in the right breast, at the outer margin. It grew slowly. There was no pain, but sometimes a severe aching in the breast, extending down the right arm to the fingers. The breasts were large and dependent, nipples normal, gland normal except for the tumor. The tumor was multilobular, and about the size of a mandarin orange. The patient had "heard so



Fig. 15. Case 12.

much about cancer" that she was firmly convinced that the lump was cancer, and she urged having the breast removed. By a semi-circular incision around the outer margin the tumor was removed, preserving the breast. Pathological examination verified the clinical diagnosis of lipoma. Fig. 15,



Fig. 16. Case 13.

taken April 5, 1915, shows the result of the operation without mutilation.

Case XIII. *Lipoma.* B., 30 years of age. Operated upon at the New York Polyclinic Hospital May, 1909, for removal of a tumor which had been pronounced malignant by a number who advised radical surgery. Through an incision (Fig. 16-A) under the breast the tumor (Fig. 16-B.) was re-

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moved, the gland tissue and ducts being left intact. The result is shown in Fig. 16-C.

Among the signs which it is customary to accept as corroborative evidence of cancer of the breast are retraction of the nipple and elevation of the breast so that the nipple is on a line higher than that of the opposite side. While it is important to



Fig. 17. Case. 14.

bear this in mind, it is also wise to remember that both may be congenital, and in no way associated with tumor formation, malignant or otherwise. Mere retraction of the nipple, in the presence of a tumor, is not sufficient evidence for the diagnosis of cancer. It may be congenital, or it may be the

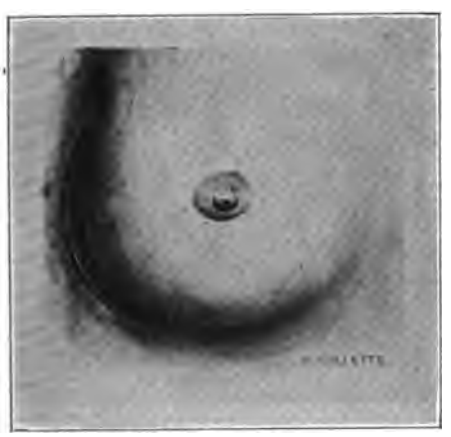


Fig. 18. Case 14.

result of disease other than malignancy. The position of the nipple, likewise, higher or lower than its fellow, may be congenital. Pain, too, which is considered among the signs of cancer, is not always dependable. Even a lipoma, as it tends to push itself out from its containing capsule, may press upon nerves and cause considerable pain. In the following case the breast which was involved in the tumor was congenitally somewhat larger than the other, the nipple was higher, and the patient complained of pain.

Case XIV. *Multi-lobular Adenoma.* S., unmarried, 19 years of age. Admitted to the New York Polyclinic Hospital April 6, 1915. Examination revealed a tumor, the size of a hen's egg, situated deep in the right breast, just above the nipple. An incision was made along the outer margin of the breast (Fig. 17), the breast was turned up, the



Fig. 19. Case 14.

capsule of the tumor incised (Fig. 18), and the tumor removed (Fig. 19, natural size). The ducts were preserved. The wound, closed with interrupted stitches (Fig. 20), gave no perceptible scar-



Fig. 20. Case 14.

ring. Fig. 21 shows the result, May 4, 1915. The relative size of the breasts and the position of the nipples are shown in this picture.

The tumor should be attacked from behind the capsule when deeply placed in the gland. When superficial it may be reached from in front. By following this general rule there will be less injury to normal glandular tissue.

Case XV. *Fibro-adenoma.* S., single, 32 years of age. First consulted me January 24, 1910. Both

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nipples were found retracted, as shown in Fig. 22, and, according to the patient, had always been so. In other words, she had congenital retraction of both nipples. A year before I saw her she observed a tumor in the left breast, which became painful. The tumor was removed and the breast saved.

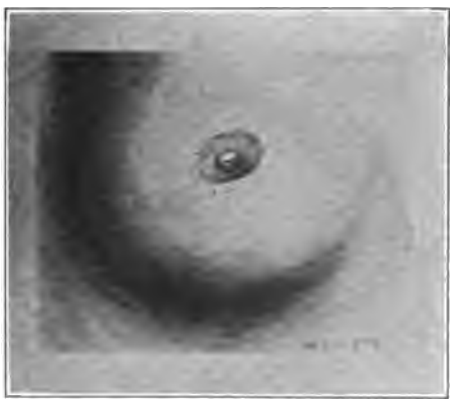


Fig. 21. Case 14.

Pathological examination of the tumor verified the diagnosis of non-malignancy.

Case XVI. *Fibro-lipoma.* V., 54 years of age. Consulted me December 31, 1909. Examination revealed a tumor in the left axilla, extending to the upper margin of the breast (Fig. 23). It was first



Fig. 22. Case 15.

noticed five years before, and had developed slowly until of late, when it began to grow more rapidly. It had also become painful. The nipple was retracted, as shown in the picture. Upon questioning the patient it was found that this was a case of congenital retraction of the nipple. The tumor was removed, and proved, upon pathological examination, to be non-malignant.

In a woman of so-called cancerous age, the presence of a slow-growing tumor which suddenly began to grow rapidly and to become painful, associated with retraction of the nipple, was strongly suggestive of malignancy. Yet one must not lose sight of the fact that even under these circumstances the tumor may be benign.

By way of contrast the following case is cited:

Case XVII. *Carcinoma.* R., married, 27 years of age. Admitted to the New York Skin and Can-



Fig. 23. Case 16.

cer Hospital April 17, 1915. Nothing abnormal was noted on inspection of the breast and axilla, except that the nipple and breast of the left side were slightly higher than the other, as may be seen from Fig. 24. Upon palpation, however, a tumor the size of an orange was found in the inner and



Fig. 24. Case 18.

lower quadrant of the left breast discovered by accident, there being no symptoms of its presence. The breast was removed, and microscopic examination of the tumor confirmed the diagnosis of malignant disease of breast and axillary glands.

The foregoing cases are cited, not because they are unique or uncommon, or because they involve any new or difficult technic, but because they may serve to emphasize the ease with which a wrong diagnosis may be made, the wrong treatment employed, the prevention of cancer interfered with,

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and the patient sent out into the world unnecessarily mutilated and with the mental hazard of being labeled "cancer." They are cited also in the hope of emphasizing anew the pitfalls into which the campaign of education as it applies to laymen may lead us. Last, but by no means least, such cases, it is felt, may serve to impress upon the general practitioner his responsibility in the matter of the conservation of the human breast, and of furthering the campaign of education along rational and safe lines.

In other words, it is hoped, by these cases and the points which they suggest, to reiterate tellingly what I have said elsewhere, that the campaign of education against cancer must begin within the medical profession. The general body of the physicians must be taught either to treat these conditions in accordance with the accepted facts concerning the disease, or to refer such patients at once to surgeons or specialists of wider experience.

SOME REFLECTIONS ON CANCER, WITH ESPECIAL REFERENCE TO CANCER OF THE SKIN.

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Statistically cancer is forging ahead. Actually the advance is gradual. It is undoubtedly positive and persistent, but yet not in pace with the compilations made in support of certain etiological theories or methods of treatment. The disagreement between the figures and the facts is due to better facilities for acquiring information than existed heretofore. All civilized communities are maintaining completer vital statistics as the years roll on. Records from remoter regions are constantly accruing. Factors previously overlooked or unavailable are now essential features of the inventory. Naturally the total soars. Add to this the highly important consideration that the diagnosis of cancer is on a firmer and more scientific basis and properly designates conditions that wrought destruction under various other appellations, and we have established a rational explanation of the opposing interpretations of the data on hand. Those who believe that something has been done to stay the course of cancer discredit the statistics. Those who believe that the surgeon has failed in his gigantic task flout them in his face. The truth, as usual, lies in the middle ground. Cancer is increasing, but not *pari passu* with the labors of the mathematicians.

But even in this more cheerful view of the situation it is idle to deny that we are confronting a problem of ever growing gravity. This is due to our inability to find a remedy. I do not mean a remedy for the individual case, because that we possess if we have the foresight to make a timely application of it. I mean a remedy for the pathological condition as an entity, whereby we may be able to forestall its occurrence in a person likely to be attacked. Having no knowledge of the cause we have no definite means of prevention or control. It is true that we may remove irritations when favorably situated and thus far curtail the activity of the unknown agent. We may, as it were, sow salt in the promising field and discourage fructuation; but this is only half a victory, for the attempt may be made elsewhere and more insidiously. We have no certain means of knowing who will be assailed, for except in the most general sort of way we do not know the conditions that fertilize the soil.

It is admitted that age is a contributing factor. Yet an immense majority of elderly people escape and some very much younger people succumb. So the proposition will have to include something besides age. Let us postulate "age plus irritation." But this combination fails very much oftener than it succeeds, for most elderly people are subjected to irritation of some kind and yet a relatively few react malignantly. Let us amend our proposition to read "age plus irritation plus predisposition." If our argument lacked definiteness before it becomes hopelessly involved by this addition. What do we mean by predisposition! Do we simply mean that one person has a tendency to the development of the disease and another one not? That is a bald *petitio principii*. Who has this tendency? In what does it consist? Is it hemic, metabolic, hormonic or nervous? What are its markings? By what shall we know it? Unless we can answer these questions all our pompous phraseology is as sounding brass and tinkling cymbals—a din to make the thoughtless gape, but conveying no practical idea whatever. If acquired, how? By occupation, dissipation, physical deprivation, or mental perturbation? If inherited, the evidence should be direct

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and conclusive. There should be no difficulty in tracing it from child to parent, and back to grandparent. But such evidence is lacking except here and there where it may be reasonably accounted for by coincidence. The instances are few, indeed, where inheritance even comes under suspicion. Were it otherwise the books would swarm with examples, as they do in dealing with tuberculosis, rheumatism and gout.

Thus the term "predisposition," of which we make so much in the discussion of the problem, is an element of which we know absolutely nothing, and until the discovery of the essential cause we shall (to employ a felicitous phrase in vogue among the churchmen) remain in a state of "invincible ignorance." If we do not know what is responsible for a thing we cannot rationally allege the participation of any supposititious constitutional vice. With regard to this phase of the discussion it will be more profitable to admit our limitations and divert our energies in a more promising direction. Thus our tripodal postulate of "age plus irritation plus predisposition" is so extremely weak in one of its legs that it is seen to move with a decided limp. Nor is its progress very vigorously maintained by the animation of the other members. We have already noted that age is not the determining factor in the incidence of malignancy. Were it otherwise the very oldest people would be stricken as with a plague. Yet after the age of fifty-five there is a steady lowering of the percentage increase among males, and the death rate is 33 per cent. less after seventy-five than it is between fifty-five and seventy-five, including both sexes. Thus while there is a gradual increase as age advances in the actual number of cases, it is not such as might be expected if age were the sole consideration. With the growing prevalence of cancer the greater is its tendency to pass the barrier of age and strike a younger element. We were wont to say that a man under forty was immune to cancer. Now we see it under thirty. True it is much rarer under than over forty, but the pressure of its malignancy is gradually tending towards the more vigorous period of life. As it slowly gathers volume it pushes in both directions.

Of the proneness of epithelioma to encroach upon the supposed immunity of prematurity, we have a lamentable illustration in xeroderma pigmentosum. This begins in early life and is the only substantial evidence in support of the hereditary transmissibility of cancer. It is a family disease. It has been aptly termed a precocious senility of the skin. The first manifestation is freckling, followed by atrophy and telangiectasis. After a period more or less prolonged, little warty growths appear which break down into true cancerous ulcerations. The picture prior to the ulcerations is a replica of an x-ray burn.

As contributing to the gradually augmenting pressure of malignant disease, the diversification of our urban populations by the immigration from so many foreign lands has been confidently adduced. But awkwardly enough, there is no preponderance of cancer in any of these races. We shall find it as often in the purest strain of New England Americanism as in the tenement-housed swarm of imported toilers. The filthy insanitation of the crowded districts seems no more prolific than the spotless hygiene of our finest mansions. Climate, diet, and, in a broad and general sense, occupation, seem to exert very little influence in the production of cancer. The man who eats rice as the staple article of diet, the man who eats fruit, the man who is a consistent vegetarian, the man who eats a great deal of fish and the man who eats a great deal of meat are just as liable, the one as the other, to take on malignant disease. The man who works in the open and the man who stands at a desk has neither any advantage in this regard. It is customary to allude to cancer of the scrotum as observed among chimney sweeps as evidence of an occupational cause. But this seems to be confined to England and has no direct interest for other peoples.

Opposed to this, let us consider for a moment how many occupations there are in which prolonged and bruising trauma is sustained for many years without the evolution of malignant disease. Observe the carpet layer driving his abdomen with tremendous force against his stretcher for hours on end during an active lifetime. Is there any record of the prevalence of deep or cutaneous cancer of the abdomen among carpet layers? Observe the cornet player forcing his lips (a locality especially susceptible to epithelioma) against the brass mouthpiece of his instrument night after night for a generation. Is cancer of the lip particularly common

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among cornet players? Observe the lather with his mouth full of wire nails for eight hours a day. Observe the dressmaker's fitter with her mouth full of pins for ten hours a day. Are these two occupations noticeably provocative of epithelioma of the mouth? Observe the piano polisher who puts the satin finish on the wood with the ball of his thumb. Conceive the amount of damage done his tissues by this constant friction. Yet it is nowhere recorded that piano polishers are more afflicted than other mechanics with epithelioma of the thumb.

This whole question of the complicity of irritation in the production of cancer involves so many contradictions that it is impossible to decide with any feeling of security. Trifling irritations of short duration have had disastrous consequences, and grave irritations of long duration have had none whatever. Thousands of men smoke for the one who acquires epithelioma of the lip. Thousands of women are struck in the breast for the one who acquires a carcinoma. Complete prolapsus uteri with a womb hanging out between the sufferer's legs, excoriated, oozing, hyperplastic and granular, with every condition favorable for the development of cancer in an organ notoriously inclined thereto, has been successfully withstood by outraged nature for over fifteen years, and the same patient has developed an epithelioma of the forehead from the presence of a seborrhoic wart! Who can reasonably interpret such a train of contradictory circumstances? This woman had age, irritation and predisposition, every factor necessary for the development of cancer (since she actually developed it), and yet some unknown additional influence diverted the incidence of the disease from the point of greatest to that of least irritation.

What shall we say of the thousands of cervical lacerations that are yawning in pools of fetid secretion, cloacal and benign to the end of the chapter, and of the nulliparous os that unaccountably acquires a small erosion busily developing into carcinoma?

Have we a satisfactory explanation of the fact that the smoker gets his cancer on the lower lip, whereas the pipe is gripped between the upper and the lower? Even if the weight of the pipe adds to the trauma inflicted on the lower lip, the suction ought to bring the upper lip tightly enough against the stem to exert some deleterious action. And what of the man who held his pipe on one side of his mouth and got his cancer on the other?

How are we to account for the immunity displayed by the stomach of the chronic alcoholic which for the better part of an average lifetime is in a state of constant irritation, with congestion of the membrane, hypersecretion of nauseating mucus, daily attacks of violent vomiting, and with the secondary connective tissue changes consequent on all persistent low grade inflammations? If a situation ideal for the development of cancer were under consideration no detail would be lacking here. And here as in the uterus we have to do with an organ frequently destroyed by cancer.

What tissue is subjected to more persistent injury than the skin over the tibia in a varicose ulcer? Yet the infrequency of cancer in this situation is emphasized by the immortalization of its discoverer. A varicose ulcer that degenerates is thereafter known as a Marjoline ulcer.

While it is thus demonstrable that neither age nor irritation is a decisive factor in the etiology of cancer, and that another quality which we denominate predisposition, and of which we know absolutely nothing, is the influence that tilts the balance of resistance, yet we are in possession of some clinical certainties that guide us in the practical manipulation of the problem. *Exempli-gratia,* while irritation fails oftener than it succeeds in precipitating cancer, still cancer is so often directly consequent on irritation that it is a matter of the merest prudence to avoid it at the time of life acknowledged to be the most susceptible. We do not know until the irritation has been somewhat prolonged, whether the individual shall reveal the fatal weakness or not, and it is folly to attempt to ascertain. It is safer to assume the probability and remove the irritation.

We know that post-maturity affords the greatest number of cases, and therefore it is about that time that we should be particularly keen in our observations. No woman should tolerate a lump in her breast if she is within the cancer term, nor, for the matter of that, even if she is considerably in advance of it. No woman, maid or married, should be indifferent to intermenstrual spotting, to a brownish vulvar oozing, or a stubborn fissure of the nipple. No man past forty should be indifferent to a chronic dyspepsia, a chronic laryngitis, a

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chronic cystitis, to a leucoplakia, or a persistent erosion of the lip or tongue.

The intermediation of moles, senile keratoses and seborrhoic warts in the evolution of cancer is a matter of general agreement. These excrescences are indubitably half way houses on the road to malignancy. Yet in any given case it is impossible to predict such an eventuation. And it is furthermore remarkable that degeneration will frequently single out one seborrhoic patch from many, with no discernible trauma to account for the discrimination. Some agency besides the presence of the patch is demanded to complete the record. Invoking the aid of predisposition avails us little because we shall be compelled to assert that the victim is "predisposed only in spots;" and we do not know what is the seductive quality that attracts the exciting cause to one of many apparently identical opportunities. These seborrhoic manifestations and senile keratoses need be nothing more than a little scurfy roughening of the skin in order to constitute a standing invitation to disaster.

Here we may as appositely as anywhere devote a few words to the consideration of the essential cause of cancer. Dismissing all discursive theories encumbering the subject and holding fast only to the actual facts, we are, in common honesty, driven to confess that after a prodigal expenditure of time and labor we have not the faintest evidence of its character. Is it metabolic? Is it parasitic? Is the attack directly from without, or through the medium of the circulation? Something may be said on either hand of alluring plausibility. Nothing has been said on either hand of convincing finality. Our attitude might be likened to that of the daring inventor who, seeking information about a patent, rashly invaded the Circumlocution Office (according to Dickens in "Little Dorrit") and nearly paralyzed by his effrontery the aristocratic attendant in the outer chamber, who breathlessly reported to his chief in the inner sanctum: "There's a fellah outside who wants to know, you know!" If we are all abroad concerning certain factors of the cancer problem, we are most gratifyingly secure concerning others. The pathological anatomy is definitive. The diagnosis thereby, when practicable, is positive. The remedy is available and, when timely, conclusive.

Cancer of the skin is practically confined to the variety known as epithelioma. There is a scirrhus of the skin which is pretty rare and is secondary to cancer of the breast or other organs. A few small nodules appear secondary to mammary carcinoma or perhaps along the line of a previous operation. They gradually multiply and fuse into a hard nodular mass. In the beginning these nodules may be only the size of a pin head. Sometimes the end-result is an infiltration of nearly the whole chest wall, forming the so-called cancer *en cuirasse*.

Melanotic carcinoma originates in pigmented nevi. All such cases were once regarded as sarcoma, but it is now believed that many of them are real carcinoma. The tumors may be pea-sized or very much larger, rounded, flattened or verrucous, varying from a slate color to purple or black. They are intensely malignant and rapidly invade the vital organs. Paget's disease of the nipple is a cancerous involvement of the nipple and areola of elderly women. It is confined to one side with very rare exceptions. The surface is moist, red and granular. It ultimately takes in the whole of the areola and may extend beyond. The nipple is fissured and retracted and eventually engulfed altogether. Palpation gives the impression, according to McCall Anderson, of a coin felt through a piece of cloth. Gradually a true scirrhus of the breast develops. In the very earliest stages only a slight scaliness or scurfiness of the nipple region may be discernible. It is very like eczema, and the likeness is sometimes intensified by the incident of itching. Grievous injury has followed the failure to mark the early distinction between these two. Eczema of the nipple occurs mainly in nursing women, prior to the usual cancer age, but this is not always a reliable criterion because cancers are sometimes untimely, as we have already noted. Eczema is bilateral; Paget's is not. Eczema itches a great deal; Paget's itches exceptionally. Eczema does not give such a sense of resistance to the examining finger as does Paget's.

In epithelioma we are dealing with a subdivision of carcinoma. The distinctive pathological phenomenon is a proliferation of the epithelium downward. There is no new growth in the sense of the engrafting of elements foreign to the part. The materials are drawn from the cells appertaining to the tissues attacked. The disease consists in a misdirection of their natural activity. They thrust themselves into the soil from which they sprung. This patricidal invasion results in the formation of

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little balls or tubules made up of the normal strata of the part, but in inverted order. These are called cancer nests or pearls. The horny layer will be within and the rete without. The pressure exerts an irritating influence upon the encompassing tissues, favoring extension of the destructive process and eventually a retardation of the circulation resulting in necrosis and ulceration. If the disease strike a region rich in lymphatics its advance will be meteoric and its transportation to distant fields astonishingly swift. The destructive agent would appear to be sucked up by the vessels and rushed headlong to a vital onslaught. Epitheliomata contiguous to mucous membranes are especially given to this speedy encroachment. Others less advantageously situated or favorably constituted for the metastatic incursion are fatuously denominated "benign." Their benignity has been likened to that of a powder magazine in the vicinity of a house afire. If conditions are propitious the sparks will not strike the powder. But given an adverse wind —and all is over. One of these "benign" neoplasms may become especially menacing because of its proximity to an important organ such as the eye. It may drag along for years arousing but a languid interest in its victim (apparently nothing but a slight disfigurement), when suddenly it will be found to have widened its area very considerably beyond the ulcerating surface and to have struck the orbit and the highly vascular conjunctiva. Its innocuity is now a thing of the past. It has stealthily ruined an eye and got beyond the range of total excision. Its future history is one of repeated vain operations to retard the ravages of its "malign benignity." The basal cell epithelioma is the one invested with such feeble powers of devastation. It might be dubbed "epithelioma by brevet," so slightingly is it appraised by dermatologists in general. The epithelioma from the prickle layer is possessed of more activity. It makes no pretence to benignity. It is frankly hostile and dangerous. It advances rapidly, ulcerates deeply and metastasizes widely. It is unusual for the quiescent variety to be transformed into the more aggressive for a long period; but deeper invasion is bound to take place sooner or later and the whole thickness of the skin and subcutaneous tissue may be affected. There is no predicting when or how the stimulus will be applied to "benign" epithelioma, just as there was no accounting for the conversion of a trifling scaly patch into a lesion fraught with such direful consequences.

In appearance epitheliomata vary much. There may be nothing more than a slightly eroded surface, with a lightly adherent scab, persistently reforming on being detached. This erosion may be inconspicuous for many months, lulling the patient into a state of unconcern, and seeming to demand no interference until firmly entrenched. To the eye of understanding, a narrow pearly edge will generally be discovered, perhaps incomplete at this early date, but finally surrounding the shallow excavation. This is conclusive. It is the gross evidence of the existence of the cancer nests mentioned in the discussion of the pathological anatomy. While usually single, epitheliomata of this sort may be multiple. The papillary element may be accentuated, and then the growth will be of a warty character, with a pronounced tendency to bleed on contact. This variety of epithelioma is pertinacious, pervasive and pernicious. Promptness is the watchword in dealing with it. The grim old proverb that "delays are dangerous" is repeatedly exemplified in the mismanagement of this neoplasm.

Rodent ulcer is a superficial form of epithelioma steadily expanding over an ever increasing area. Its border is very little raised and its ulceration is quite shallow. It does not advance rapidly, but it does so persistently until a large tract may be involved. It is slow to metastasize. If carefully examined its border will be found of the rolled pearly type distinctive of epithelioma.

The crateroid epithelioma conveys to the imagination the impression of a miniature mountain with a depressed summit. The rolled nodular border is in unmistakable evidence. This is a later stage of the deep seated growth which first attracts attention when about the size of a pea and which is usually disregarded until the skin becomes glossy, red and adherent.

Lobulated epithelioma assumes the appearance of a lipoma, with the difference that ulceration soon crowns the convolutions of the graver disease.

There is one particularly curious departure from the ordinary type of epithelioma in the flat or parchment form. It displays an utter lack of correspondence to the familiar manifestations of the malady. It is inconspicuous. It is not perceptibly infiltrated. It has no elevated border. No pearly nodules are discoverable. It never ulcerates. The

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skin simply seems to take on a slightly yellowish tinge of a little deeper shade at the periphery. It bears a marked resemblance to a patch of morphea.

Multiple benign cystic epitheliomata, while of true epithelial structure, are practically innocuous, rarely degenerate, and aside from their annoyance are utterly negligible. They are smooth glistening papules varying in size from a pinhead to a lentil. Their appearance is almost vesicular, but they are actually firm and solid. They are abundant on the face, neck and shoulders. Consider the difference in proneness to malignant degeneration between this "ready made" epithelioma and the senile keratoses that cause so much uneasiness. It simply emphasizes our absolute ignorance of the conditions making for malignancy.

Epitheliomata may be round, oval or angular. They may be superficial or deep. With the single exception of the flat parchment variety they all possess the quality of scabbing or crusting obstinately. This is a feature that cannot be too forcibly impressed. It gives rise to a perfectly justifiable suspicion in every instance and in many is sufficient to establish a diagnosis.

Epithelioma may occur anywhere on the skin or mucous membrane, but shows a preference for muco-cutaneous junctures. Cheeks, forehead, temples, eyelids, nose and helix of ear may be invaded. Shoulders, chest, penis, vulva, anus, buttocks, dorsum of the hand and ball of the thumb have been involved and frequently without discernible irritation. I have observed its appearance upon an umbilical hernia. In point of fact no locality is perfectly safe against its visitation, although some show greater power of resistance than others.

Pain may be marked, slight or lacking, depending on the situation of the lesion, its virulence, and the sensibility of the patient.

At first glance the diagnosis of epithelioma would appear to be clearly outlined in the description of its varied manifestations. Unfortunately, however, it is found to bear, on some occasions, a remarkably close resemblance to two other conditions demanding very different treatment and presenting a very different prognosis. These are lupus and lues. The detection of the pearly nodules in the border is conclusive for cancer. Their absence does not invalidate that conclusion. It leaves it in doubt.

Lupus in an immense majority of cases begins in early life and thus avoids collision with epithelioma. But as a corollary of this, a few cases begin later in life and may be the cause of indecision.

An old lupus may display a ragged ulceration in an infiltrated area, creeping slowly onward, eating out a nostril, nibbling at an eyelid, or riddling and distorting a lip. The snap diagnosis would be cancer because of its greater likelihood at this time of life. Lupus is a very much slower moving neoplasm than epithelioma. It is pulpy. Its bulk is composed of soft infiltrations in a zone of inflammation. These infiltrations are easily penetrated by a wooden toothpick, and under the pressure of a glass spatula stand out as little apple jelly nodules, ineffaceable in the skin. The conglomerate of such units is still soft. The inflammatory reaction, long continued round about, may add an element of firmness, but not the rigidity that characterizes the epitheliomatous mass. As lupus encroaches by the deposition of new yellowish brown nodules, it is nearly always possible to discover one or more of these thrown out as skirmishers, as it were, before the main advance. Epithelioma, in addition to pearly border and persistent scabbing, will impress us with a sense of hardness. Its edge is rolled and cordlike.

There is often a palpable extension of the growth under the skin beyond the limits of the ulceration. If a reliable history is obtainable, the manner of the beginning of the lesion will dispel all uncertainty. If we can elicit the detail that the first phenomenon was a soft brownish nodule, the diagnosis is indisputable. The ulceration of lupus is shallow, but this is seldom of much assistance because the ulceration of cancer may be shallow also, and in any event comparisons of the relative depth of two objects not in juxtaposition are decidedly misleading.

While we are seldom called upon to differentiate between lupus and cancer, we are often called upon to differentiate between cancer and lues. It has been somewhat flippantly and unkindly said that the discovery of the Wassermann reaction has seriously curtailed the surgeon's opportunities. It is conceded, however, that many

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cases of luetic ulceration had been triumphantly "cured" by operation, and many cases of epithelioma diligently mistreated as lues. So perhaps the balance was fairly struck, and the mistakes of the surgeon offset by those of the physician. It was on the mucous membranes that the blunder was most likely to fall. The purely cutaneous lesions were more easily distinguished. At times, however, their similarity was very striking. The mimetic proclivities of syphilis are proverbial. Its versatility embracing the whole range of dermatology, it is not surprising that it occasionally assumed the aspect of epithelioma. Conversely it is not surprising that epithelioma has occasionally masqueraded as lues. The luetic manifestation most likely to create confusion is of the tertiary period which is frequently observed within the cancer term. It is the tubercular ulcerating syphiloderm, which is a flattened, dark-red elevated lesion of varying dimensions, ulcerating sluggishly, oozing offensively, crusting repulsively, and forming with its fellows various outlines such as crescents, circles, flutings and undulations. A round or oval ulceration of this sort with its infiltrated edge on the face of an elderly patient, is not a bad imitation of an epithelioma. If we proceed with caution, however, we shall be able to fix its identity. The pearly border of the epithelioma will be missing. The rigid resistance of the epithelioma will be replaced by the pulpier feel of the granuloma. The secretion of the syphiloderm is purulent and putrid; the secretion of the epithelioma is scanty and odorless, and quickly dries into a scab.

The Wassermann reaction has brought us wonderful aid and comfort in the puzzling situations that sometimes arise. Its decisions are speedy and in the main correct. Observe the note of uncertainty in the last sentence. It has fallen to the lot of all of us to get negative Wassermann reactions in undeniably luetic cases. Since this paper was begun I have seen a woman with a red lobulated pitted nose, recognizable from afar as of luetic origin, yield a negative Wassermann and a positive luetin reaction. Had the Wassermann alone been allowed to influence our judgment, that case would be treated indefinitely as one of aggravated rosacea. The eye of the experienced clincian is entitled to as much regard as that of the serologist. If their findings are flatly contradictory, further observation is in order. A positive reaction is conclusive, that is to say, it is conclusive of the existence of lues, but it is not invariably conclusive of the luetic character of the lesion under observation. Syphilis is not prophylactic of cancer. A man with a four plus Wassermann may develop epithelioma. Reasonably interpreted the conclusions of the serologist are of immense advantage, especially in the saving of time. Too implicitly depended upon, they may lead us into serious error. We may be forced at times to resort to biopsy, if doubt cannot be resolved in any other way.

Chancre of the lip has been diagnosed epithelioma. The error has been made in elderly patients on whom the suspicion of malignancy instantly falls. The distinction rests largely upon the celerity of the luetic lesion and the tardiness of the cancerous. The induration of the chancre is rather a dubious dependence, because the epithelioma partakes also of this character, and comparisons of relative induration, like comparisons of relative depth, are very unreliable. The chancre will be accompanied by a satellite gland under the jaw. If metastasis has occurred the cancer will be accompanied by a chain of glands. A misjudged chancre may of course persist long enough to give a later observer an impression of the duration adequate for an epithelioma. But by that time the secondary manifestations of lues should be in evidence. Unfortunately, until these appear the Wassermann reaction is unavailable. A spirochete examination may give us some assistance in this dilemma. If the rolled pearly border of epithelioma is discoverable the identification is immediate. The situation is rarely so confusing that reasonable care will not clear it up. But it is just where we have an atypical prolongation of the chancre term, or an atypical acceleration of the cancer term, that the two conditions will call for discrimination. The key to accuracy is a slow deliberate analysis of all the circumstances, avoiding preconceptions and immature conclusions. With both possibilities in mind and a calm judicial poise we may be sure of escaping the trap.

All that has been said of epithelioma of the lip applies to that of the tongue, eyelid, cheek and penis. In the last situation decision must be

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reached with the greatest circumspection, because of its being the preferential habitat of the chancre by a thousand to one. Malignancy of soul as well of body may stigmatize the old. They may be lecherous as well as cancerous. Doubt; delve; deliberate.

The diagnosis of epithelioma having been established, how shall we treat it? Do not "treat" it at all. Cut it out. Dr. W. S. Bainbridge, in an exhaustive presentation of the subject in his masterly volume entitled "The Cancer Problem," has shown beyond the possibility of refutation that that is the only sane thing to do. Other measures are incomplete and injurious. This uncompromising attitude is not to be attributed to a selfish desire on the part of the surgeon to exploit his own proficiency. It is supported by every argument drawn from common sense and the widest experience. Every other procedure leaves in doubt the total removal of the noxious tissue. Not only that: it tends to stimulate what it does not destroy. There is no doubt that Marsden's paste has effectually disposed of epithelioma on more than one occasion. The testimony is too positive to be gainsaid. Neither is there any doubt that it has failed on more than one occasion, and after a period of horrible torture and dangerous constitutional disturbance left its victims in an infinitely worse condition than at the beginning. The reaction from arsenic applied to the skin is appalling. The tissues swell enormously. The pain is agonizing and endures for days. The absorption of poison into the circulation both from the destructive paste and the resultant slough is sufficient to jeopardize the life of the sufferer. And all for what? A very doubtful advantage. The knife would encircle the growth in unaffected territory, and cleanly, swiftly and mercifully accomplish its removal. There would be no hideous reaction, no maddening pain, no grave constitutional derangement. The risk from the anesthetic would be trivial compared to that from the toxic absorption. The shock from the operation would be insignificant compared to that of the arsenical conflagration. As for the anticipatory emotions of a timorous patient, if the immediate and ultimate results of both procedures were truthfully described, there is no question in which direction his judgment would incline. It is ignorance of the relative danger and suffering that leads to unwise decisions. It is our duty to remove this ignorance and honestly counsel the wavering ones beseeching our assistance. Other chemical applications have had a fleeting vogue in the "treatment" of epithelioma, and even where results have appeared to follow, they have proved to be nothing but a temporary obscuration of the threatening picture, an epidermization of the ulceration, the drawing as it were of a thin veil of pretence over the ravaging actuality beneath.

The matter of the x-ray is a delicate one to dispose of. Much is claimed for it and much is charged against it. Its advocates urge its destructive qualities in superficial epitheliomata. It will not accomplish any more than the knife, for confessedly it cannot. It may not accomplish as much. In that contingency it will probably aggravate. Its well known excitation of epithelioma on the hands of careless operators must not be overlooked in weighing its pretensions as a curative agent. It has not one solitary merit to recommend it where operation is practicable. Where operation is impracticable the x-ray is useless.

It is only necessary to make a passing allusion to solid carbon dioxide, as a "remedy" for epithelioma. For in every truth solid carbon dioxide *is* passing. It produces a great deal of local reaction in the form of a blister. It temporarily exsanguinates the deeper tissues by the process of refrigeration. Admittedly it does not destroy them. The blood supply is restored and augmented in a very short time. *A priori* it creates conditions for the aggravation of the neoplasm.

Let us consider curettage. It is offered as a substitute for the knife by half-hearted advocates of operation. It is proffered as an emasculated surgery—a surgery with the surgery taken out of it. It is an exceedingly clumsy, inefficient and dangerous procedure. It mauls, mashes and mangles the tissues. It rips open sinuses for the absorption of cancer elements and then forces them in. It is usually followed by application of the nitrate of silver stick. This is equivalent to putting "a nigger on the safety valve," for nitrate of silver sears the surface and carefully bottles up the malignant residue which it is powerless to destroy. If performed without anesthesia curettage is brutally painful. If performed with either general or local anesthesia it is a stupid blundering and groping

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makeshift for the clean, accurate and artistic efficacy of the knife. There is nothing that the curette could possibly do that the knife cannot do better.

Radium. All honest observers are agreed that if the neoplasm is removable by operation it should be thus removed. If there are contraindications relating to locality, accessibility, or liability to shock, radium may be resorted to. It is undeniable that cures have been thereby effected. It is also undeniable that relapses have occurred. The enormous cost of radium limits its availability and delays the thorough investigation of its destructive action. It may be that when we have plumbed the depths of its possibilities and learned the conditions of its highest efficiency, we shall have solved the cancer problem. Pending that millenial dawn, let us heed the counsel of the master surgeon and cut the cancer out.

Let us disabuse our minds of the misconception that epithelioma is a dermatological disease to be tinkered with by dabs of paste, shafts of light, bits of ice, and the wild plunging of a curette. Let us realize that we have to do with a vital agent of destruction shooting its tentacles out into the normal territory, endowed with a power of resistance more than sufficient to defeat any pitiful picking at its surface, and endowed with a power of recuperation sufficient to cause regeneration from the most infinitesimal particles of its malignant being that may have escaped excision. Realizing all this, let us not underrate the tremendous importance of the most insignificant of these "benign" impostors. Let us give it no opportunity to steal a march upon us. As soon as it is recognized for what it is, let us "cut it out."

323 W. 14th Street.

Cancer of the Breast.—Dr. Parker Syms (*N. Y. State Jour. of Med.*, July, 1915) urges that one should never operate upon a tumor of the breast without having the patient's consent to do the radical operation should it be found to be indicated. In cancer of the breast two-stage operations are not to be sanctioned. For diagnosis one must depend upon his clinical sense and surgical judgment. The frozen section should never be relied upon to determine a doubtful case. When one is called upon to do a so-called palliative operation, one should strongly consider the propriety of performing this major operation instead. The risk is scarcely greater, and there is the possibility that a radical cure may result.

DANGER SIGNALS OF CANCER OF THE FEMALE PELVIC ORGANS.

By S. W. BANDLER, M.D., New York.

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If pain were one of the symptoms of malignant conditions involving the pelvic organs of women, early diagnosis would probably be more frequently the rule. The nature of the malignant growths which involve the vagina, cervix, uterus and adnexa is such, that even though infiltration take place, pain is rarely experienced until the bladder or the ureters or some organ of that nature is likewise attacked.

The symptoms to which women do pay attention are anomalies of menstruation and leucorrheal discharges. They are accustomed, however, to hear that at or about change of life period irregularities of menstruation very frequently occur. They also believe that leucorrheal discharges of various sorts are a natural accompaniment of the menopause age. This idea is so widely spread, that it is essential, in order to bring early cases of malignant disease to the surgeon's hands, to correct this very erroneous impression by words of caution.

Menstruation does not increase at or about the menopause period, unless there is real, tangible or physiological reason for the same. It is not an increase of menstruation which is a danger signal. It is the occurrence of a bloody, serous discharge, or bleeding on coitus or a recurrence of bleeding after a varying period of menopause which is a symptom of tremendous importance.

Any woman who has ceased to menstruate for several months or years, and who again brings to the physician's attention the occurrence of a bloody discharge or what may be called a menstrual flow, must be examined with the greatest care so as not to overlook the possible presence of a malignant growth.

Any woman who develops a new form of vaginal discharge, especially if blood-tinged, but more especially if very disagreeable in odor, must be examined most thoroughly to detect the existence of a possible malignant tumor.

The early stage of a carcinoma of the uterus, whether located in the vaginal portion of the cervix, or within the cervical canal, or within the uterine cavity, gives no evidence by any symptoms. It

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simply furnishes a new production of cells associated at varying periods with varying degrees of infiltration into the immediate tissues. Then, what is most important and what cannot be diagnosed, is the association, often very early, of metastatic deposits in the various glands of the pelvis.

The early stage of cancerous growth gives no symptoms in the way of bleeding, of discharge, nor of pain. Only when the growth begins to break down or degenerate does a hemorrhage or bleeding develop or a very disagreeable discharge due to the growth of saprophytic bacteria on the degenerating cells. When such malign symptoms appear, the case is indeed serious.

Not every woman who bleeds more or less irregularly several years after the menopause does so because of a malignant growth. I have operated on many cases where possible malignancy was suspected, only to find fibroids of larger or smaller size in the body of the uterus near the uterine lining. We are confronted here with the same problem that presents itself with ectopic gestation. Many a case is watched and studied as a possible ectopic, which proves to be an incomplete abortion, or a polyp, or an inflammation. Nevertheless, the indications for excluding the existence of an ectopic gestation are there, and the avoidance of a possible error is the duty of the attending physician.

The types of carcinoma of the uterus and cervix are the squamous-celled or cauliflower type, which involves the outer portion of the cervix, the high cylindrical type which arises from the lining of the cervical canal, and then comes the type which arises within the uterine lining itself. Here the carcinoma may be located in a small area of the mucous membrane or it may be more or less diffusely extended over the entire lining of the uterus, or we may have polypoid overgrowths or excrescences of various forms in the uterus, some of which in the early stages may not have been malignant.

Conditions of this latter sort, not malignant, may give rise to irregular bleeding or to a leucorrheal discharge lasting and extending over a period of months. But this type rarely gives the typical beef-juice discharge nor does it give the disagreeable odor associated with degenerating carcinomatous tissue.

The fortunate thing about carcinomata growing in the uterine cavity is that their extension into the surrounding lymphatic tissue is very slow. These tumors may be in the uterus for months or even a year or more without extending beyond the limits of the uterine tissue. This is due to the fact that the lymphatics in the upper part of the broad ligament are very sparsely developed, whereas in the lower cervical segment around the internal os and lower down the parametrium and lymphatic tissue are so rich as to be invaded ofttimes before the tumor has reached any great size. Hence, the prognosis in cases of carcinoma of the uterine cavity is far better than is the case with carcinoma of the cervical canal or of the uterine cavity.

However fortunate this may be, the sad feature is that such growths occur only in ten per cent. of all cases of carcinomata of the uterus. It must be remembered that extension into the pelvic lymphatic glands rarely produces any symptoms of pain, and that extension into the parametrium to the right or left of the uterus, or anteriorly under the bladder, or posteriorly towards the rectum, rarely produces symptoms of pain unless the extension is so great in amount that by pressure or other phenomena, we observe this symptom.

When this condition has been reached, as a rule operative interference is no longer a wise thing.

Sarcomatous changes in fibro-myomata of the uterus are not associated with typical symptoms. They are diagnosed as a rule by microscopic examination.

The symptoms of such sarcomatous changes are rarely different from the symptoms of an ordinary fibro-myoma. Pure sarcoma, as such is an extremely rare disease.

Malignant disease of the ovaries may come under the heading of primary carcinoma of the ovary or under the heading of malignant papillomatous changes in ovarian cystomata.

Cystic ovarian tumors are usually considered to be harmless except for their pressure effect, while solid tumors of the ovary, whether papillomatous or not, are generally malignant in their nature. It must be remembered that cystomata of the ovary often contain within the daughter cysts papillomatous excrescences. When these excrescences continue to grow and penetrate the outer covering of the ovary, so that secondary deposits develop wherever they come in contact with the peritoneal covering of the organs of the pelvic abdominal cavity, we are then dealing with what constitutes a relatively malignant tumor.

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Such papillomata are invariably associated with ascites, so that ascitic accumulation in the abdomen, if tuberculosis can be excluded, usually points to a malignant involvement of one or both ovaries.

Unless a cyst of this sort have a twist of the pedicle, the symptoms in the early stages are very slight. Referring again to uterine cancer, it may be said that any tendency to irregularity of menstruation must be viewed as a possible symptom of a dangerous nature at the menopause age.

The sad feature about these malignant conditions is that different individuals react differently to the operative procedure, and for that reason we have come to the conclusion that we are rarely in a position to definitely say, except in the very favorable instances (and not even in those always), whether a recurrence is likely or no.

The peripheral extension of a malignant growth may not be all malignant. It may be edematous or inflammatory, hence, the degree to which the growth has involved the surrounding tissues is not always definitely settled by bi-manual examination. Hence, while we are all aware of the fact that the danger from carcinoma is direct extension and extension into distant lymphatic glands, nevertheless, the dangerous features must not always be accepted at their face value just because a large amount of peripheral infiltration is found in many special cases. Just the reverse is likewise true and a very good prognosis dare not be given in those cases where only a primary growth is found and bi-manual examination shows no extension directly into the periphery or any distant lymphatic gland.

The fact of the matter is, that the very early symptoms of malignant disease in women are so slight and escape observation so readily, that only the eye can recognize a malignant growth of the vaginal portion of the cervix in the early stages. A carcinoma lining the cervical canal may, even with the very best of examinations, escape observation unless curetting be done, because these tumors are not always growing out into the lumen forming new tissues excrescent-like in character. Very often these growths are very superficial, ulcerous mainly in nature, and escape detection by the finger or the examining touch with the sound. The only step to adopt is the principle that every woman should be considered a possible cancer case unless thorough and complete examination has excluded its existence.

A word of caution should be given with regard to the so-called harmless polyp of the cervix. It frequently happens that out of the cervix grows a polyp very often of mucous membrane, varying in form, and that this is considered a simple excrescence of no moment.

It must be remembered that frequent examinations of such cases show that at the base particularly, malignancy may be noted on microscopic examination when never suspected from the growth's macroscopic appearance.

It has been my rule to consider all polyps as possible cases of future malignant growths in women at or near the menopause age, and I would consider it always more advisable to do a complete hysterectomy than to simply remove the polypoid excrescence and then for months and years be obliged to watch that patient for malignant growth at the seat of the original supposedly simple polyp. If this be true of polyps which may be appreciated by the sense of touch or by the eye, the same holds true of any overgrowth of the mucous membrane in patients who have passed or come close to the menopause period.

Any overgrowth of tissue in the uterine canal should be considered as an abnormality to be watched henceforth or removed for diagnostic or therapeutic purposes.

Even if only in rare instances are we successful in finding that the scrapings from such cases are in the pre-malignant or malignant stage, it is well worth while finding the beneficial results even if it is only one case out of one hundred.

In addition to the symptoms of bleeding of an irregular nature and disagreeable leucorrheal discharge, and in some instances pain, I would consider among the danger signals the existence in the uterine cavity of overgrowth of mucous membrane as evidenced either by the presence of a leucorrheal discharge, increased size of the uterus, or the discovery of this condition by the use of a sound used for diagnostic purposes.

It is strange that so simple a procedure as the excision of a small piece from the cervix for examination, or a curettage done for the purposes of examination is not more readily acquiesced in by the laity. It is less strange, however, when we find not infrequently in the families of physicians themselves a disinclination to permit this very simple procedure the value of which cannot be over-estimated.

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134 W. 87th St.

PRECANCEROUS LESIONS OF THE RECTUM.*

By E. H. TERRELL, M.D., Richmond, Va.

There is no disease which causes more intense suffering than cancer, and none upon which humanity looks with such extreme dread. In recent years, particularly during the last decade, experts throughout the whole civilized world have had their attention focused more and more upon this dreaded malady. Magnificently equipped laboratories, with unlimited means at their command, have been established in various places, and international conferences are held from time to time, at which enthusiastic workers from all parts of the world meet and discuss the results of their researches. While much has been learned in regard to the nature of the disease, the origin and cause are still unknown and no definite and certain means of treatment have been found. It is earnestly hoped that a specific will in time be discovered, for if we are to give credence to the statistics at hand, cancer is increasing at an alarming rate. Some maintain, however, that this increase is more apparent than real, because of improved methods of diagnosis, more accurate statistics and better co-operation on the part of the public. At any rate, the annual mortality from cancer in our country is appalling.

The discovery of a specific for cancer, other than its eradication by excision, which is a specific when resorted to early enough, would seem to depend upon the proof of a parasitic origin, and it is along this line that indications point to a possible hope. While they are in the minority, there are quite a number of very enthusiastic supporters of this theory. Probably the best evidence yet produced favoring this side of the controversy is that brought out by the Bureau of Plant Industry of the United States Department of Agriculture. They seem to have proven rather conclusively that cancer in plants is due to cell stimulation, the result of a parasitic infection. A report of these experiments should be in the hands of every physician, and may be obtained by applying to the Department of Agriculture. They are very interesting.

While the signs may be somewhat encouraging, it is not for us to sit idly by and wait until the experts give us some easy and more definite means of treating this very prevalent and distressing disease. We know that there is a stage in every malignant growth in which it is entirely local, and at which time, if accessible, it can be permanently eradicated. Bloodgood and others even go further than this and say that cancer never originates in healthy tissue; that there is always a pre-existing defect which is benign, but favorable to cancerous development. From this idea has arisen the use of the term "pre-cancerous," as applied to benign lesions which left alone ultimately result in malignancy. To my mind, it is a very fortunate term, and its use should be encouraged. It has been predicted that the future of medicine will be largely preventive, and if we can instil into the minds of the public that cancer is in a large measure preventable, then we will have accomplished much towards its eradication. To get the lay mind to comprehend this is going to be a hard and tedious task, but working together, each in his special field, we may accomplish much.

The advocates of this pre-cancerous treatment lay particular emphasis upon the attention to lesions occurring upon the surface of the body and exposed mucous membrane. These, of course, are more readily detected and their behavior more easily observed than those which occur in deeper portions of the body.

In a paper on "Multiple Adenomata of the Rectum" read before the American Proctologic Association at Atlantic City two years ago, and published in the September issue of the *Proctologist*, 1912, I maintained that cancer of the rectum was almost invariably preceded by benign ulceration. At this time I am more thoroughly convinced of the correctness of that assertion, although most of the cancers of this region seen by me have so far progressed that it is utterly impossible to locate by examination the original site of the growth. Taking careful histories of these cases, however, will always reveal the pre-existence of a fissure, ulcerating hemorrhoids, polyp, diarrhea, or some other symptom referable to the rectum. In most cases the symptoms have existed for years. Most diseases of the rectum are of a simple nature and easily cured, but there is no portion of the body which receives less consideration when diseased. The great prevalence of hemorrhoids and the tendency of the laity, and some of the profession, too,

* Read before meeting of Association of Seaboard Air Line Railway Surgeons, October 19, 20 and 21, 1914.

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I am sorry to say, to attribute every disorder of these parts to them is largely responsible. Why should not a discomfort or pain about the rectum, a persistent diarrhea with tenesmus, or loss of blood at stool demand as thorough an investigation as symptoms of diseases in other parts of the body? The rectum is easily examined if one is equipped with the proper instruments. With some experience, the interpretation of the findings is not usually difficult. Not until the profession realizes that inflammatory and ulcerative lesions about the rectum are great predisposing factors in malignancy of this organ, will we accomplish very much in the prevention. Few cases of malignancy of the rectum are seen by the surgeon until most of the guaranteed hemorrhoid salves have been exhausted. The delay while these are being tried out has robbed many a poor unfortunate of the last vestige of a chance. When we take into consideration that fifty per cent. of all cancers occur in the gastrointestinal tract, and that sixteen per cent. of these occur in the rectum or sigmoid, we should readily understand how important it is to thoroughly examine every patient who presents rectal symptoms. Even youth does not preclude the possibility of malignancy, for several cases of cancer of the rectum have been reported in children as young as fifteen years.

As previously stated, I cannot believe that it is possible for a cancer to occur in a healthy rectum. Except reflexly, no organ in perfect health will give symptoms. No disease of the rectum can exist very long without manifesting itself in some way or other, and most often it is done in no very uncertain manner. Every one is duly warned in time, but most often these warnings are unheeded. The symptoms from lesions which will become malignant may be no different from those which will not. In fact there is no way to differentiate between them. We must urge upon all to seek the best advice and an examination immediately upon the appearance of these warnings. No treatment should be attempted until after a proper examination. I think this advice applicable to every part of the body.

It is true that a few among many who have suffered from rectal disease develop cancer, but remember that eight per cent. of all cancers occur in the rectum or sigmoid; certainly a sufficient number to claim the attention of every physician.

With our present knowledge of the disease, cancer cannot be conquered unless these early warnings of little "innocent" lesions are heeded.

Malignant diseases of the rectum come on insidiously. There are no characteristic or pathognomonic symptoms in the early stages. Most often there is a continuation of former symptoms with gradually increasing severity. Once begun it spreads rapidly, as a rule, and metastasis occurs early. The only treatment is excision which is a very formidable operation. At best the percentage of cures is small. An ounce of prevention at the proper time would reduce cancer of the rectum to an almost negligible quantity. It is to be hoped that each one of us, and physicians in general, will become more alert to the responsibility resting upon us in regard to this very serious problem, for it is only through us and our teachings that cancer will become recognized as a disease largely preventable.

THE DIAGNOSIS OF TUMORS BY THE FROZEN SECTION METHOD, ITS VALUE AND LIMITATIONS.

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Many surgeons have for years been employing the frozen section method in cases where malignant growths were suspected and they wished to determine the extent of their operation by the pathologist's report. Other surgeons look upon the procedure with skepticism and rarely employ it, if at all. This, in some cases, is because their experience has been unfortunate in getting reports which did not tally with the findings in later celloidin or paraffin sections; in other cases because the tissues were not suitable for freezing, and in still others perhaps because the pathologist would not venture an opinion. It has been our experience that surgeons who have not had a previous training in this form of pathological diagnosis need to have pointed out to them both its value and limitations. The object of this paper is to deal briefly with these two aspects of the matter.

The frozen section method, as we shall discuss it, refers to the freezing, cutting, staining and examination of fresh tissues during the course of an

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operation, as a guide to the extent of procedure necessary. Formalin hardened tissues are often frozen for sectioning and furnish good permanent specimens, but this method takes too long to apply where the patient is under an anesthetic. The pathologist should be ready to make the microscopical study and diagnosis two to three minutes after receiving the tissue, and in many instances one glance at his section will enable him to give a report; if not, he still has time, by resorting to a simple technic, to study his first section carefully and, if necessary, to cut one or two more blocks of tissue.

Freezing is best accomplished by the use of a carbon dioxide gas cylinder to which one of the simpler forms of microtomes is screwed. The frozen block of tissue is raised by a succession of short quick turns of the horizontal wheel while one or two dozen sections are cut with a chisel or plane-shaped knife. These are then pushed off the knife into water, and a thin section floated on to a slide immersed beneath it. A drop of a half saturated aqueous solution of thionin* is put on to the wet section, the excess drained to the other end of the slide, and the study of the section begun while it is staining. The thionin at first stains the nuclei and then gives a pink tinge to the cell bodies and connective tissue. The more elaborate styles of freezing microtomes with automatic raising attachments are better suited to formalin hardened tissues or where time is not a factor. Most hospital laboratories are equipped with carbon dioxide for freezing. Where the cylinders are not available or the operation takes place in a private house it is necessary to use the ether spray microtome, which is of the same type but easily carried in a hand bag. The freezing by ether is slow and should be supplemented by an ethyl chloride spray from above, and it is of advantage to have the stage already chilled by placing a piece of ice on it just before the tissue is expected. A foot pump such is is used for a blow pipe also adds to the ease of the process, as it enables one to keep a continuous stream of ether vapor playing upon the stage, leaving both hands free for adjusting and cutting. Thin pieces of tissue can be frozen by ether in this way in from one to two minutes.



Fig. 1. Freezing microtome (Bardeen type) attached to cylinder of carbon dioxide. The block of tissue is raised by turns of the horizontal wheel.



Fig. 2. Portable ether freezing microtome (Cathcart type). Ether vapor is sprayed from below the stage by use of foot pump connecting with ether bottle and at the same time an ethyl chloride spray is played directly on the tissue from above.

Type of Lesions Suitable for Frozen Section Diagnosis.—In a general way the firmer the tissue the easier will it be to get thin sections for

* For use of thionin see F. C. Wood, Proc. N. Y. Path. Soc., 1901, N. S., Vol. I, p. 110.

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study. Fatty tissue, edematous tissue, necrotic tissue all melt away, so to speak, when cut into water, and very little material remains to be spread on the slide and stained. For this reason a myxomatous tumor or one much inflamed or necrosed presents great difficulties. A myoma, a fibroma, a scirrhus carcinoma are all easy to handle and cut. This is from the pathologist's standpoint. From the surgeon's standpoint the diagnosis is called for in cases where the lesion is deep seated or extensive, so that a general anesthetic is necessary and it is desirable to complete the operation indicated with one anesthesia. The two regions where this condition most often presents are the breast and the uterine cervix. Other regions where diagnosis is less often called for are the tongue, buccal mucous membrane, lip, anus and vulva. While in the case of uterine curettings a diagnosis would be very desirable, the small size and friability of the tissues render them very unsuitable for freezing, and as the aim always is to cut every bit of tissue from a curettage, the examination of one or two of the larger pieces would be of value only if giving a positive finding. In the case of uterine polyps and submucous fibroids the conditions are more favorable and it is possible with one or more sections to exclude malignant new growths. Small tumors of the skin are usually excised completely and there is no call for diagnosis at the time.

An analysis of cases where diagnosis has been called for will give an idea of the surgeon's demands in this line of work. Records are available for a period of about ten years and cover examinations made for twenty-six different surgeons in four hospitals, together with outside cases.

There were 150 cases in all, divided as follows:

Breast tumors	107	of	these	46	showed	carcinoma
Cervix	16	"	"	6	"	"
Uterine polyp	7	"	"	0	"	"
Uterine curettings	3	"	"	0	"	"
Lymph nodes	3	"	"	2	"	"
Buccal cavity	2	"	"	1	"	"
Lip	2	"	"	1	"	"
Rectum	1	"	"	0	"	"
Uterine growth	1	"	"	0	"	"
Vulva	1	"	"	1	"	"
Knee	1	"	"	0	"	"
Shoulder	1	"	"	0	"	"
Testicle	1	"	"	0	"	"
Jaw	1	"	"	1	"	sarcoma
	150			61		

Forty per cent. of the suspected lesions thus proved to be malignant and in these cases radical measures could be instituted at once. In the remaining 60 per cent. the patient doubtless was in many instances saved from what would have been an unnecessary mutilation. In this series two cases not diagnosed as carcinoma by frozen section, but shown by the celloidin or paraffin method to be carcinoma, were (1) curettings from the body of the uterus and (2) a cervix showing beginning carcinoma which is referred to later in this paper.

The Question of Diagnosis as it Applies to Different Regions:

1. *In breast cases*:

In deep seated, small growths without involvement of the skin or nipple, the surgeon in most instances operates with only a tentative diagnosis, and if a pathologist is not at hand to give a microscop-



Fig. 8. Eroded and thickened cervix which showed carcinoma at two points by frozen section.

ical report, he will have to depend on gross appearances to decide on the extent of his operation. In the case of a cyst, an intracanallicular fibroma, or a typical gritty carcinoma this is a comparatively easy procedure and a fairly safe one. However, cyst walls will at times show carcinomatous changes and tuberculosis of the mammary gland very closely resembles scirrhus carcinoma in the gross. Chronic mastitis also gives a very hard, dense consistency to the tissues. Frozen section will reveal the presence of carcinoma, and if a large area of the breast is under suspicion, the pathologist has as good an

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opportunity as he ever will have to slice it up carefully and then freeze the spots most suggestive of new growth. The attitude taken by some clinicians that a negative diagnosis does not exclude cancer might be applied to all forms of pathological diagnosis, for very seldom, if ever, can serial sections be made of all the tissues removed. The pathologist in making his diagnosis depends largely on his ability to select, in the gross, the areas that should be sectioned. Sarcoma of the breast, a rare condition, in frozen sections is hard to differentiate from a cellular fibroma. Here, if in doubt, the pathologist will do well to wait for his paraffin sections. The axillary lymph nodes can be readily sectioned and their invasion by new growth recognized, if their condition is to be a guide to the extent of the operation. In some instances the surgeon has asked for a report on an enlarged node, opening the axilla first and amputating the breast afterwards if the node showed cancer.

2. *Cervix of the uterus cases*:

An enlarged cervix with erosions always presents the possibility of cancer. This condition can be excluded by ordinary sections after amputation, but if present a later operation for hysterectomy will have to be done. Frozen sections are easily made here and new growth can ordinarily be found. The accompanying photograph (Fig. 3) shows a cervix in which at two different points by frozen section carcinoma was found and the surgeon was able to proceed without delay to a vaginal hysterectomy. The body of the uterus in this case did not show new growth. In another case, seen several years ago, sections at the time of operation failed to show carcinoma. Subsequently, cutting from many areas, a very early new growth was discovered, so early in fact that some pathologists would not accept it as true cancer. Such debatable tumors, of course, are not suitable for rapid diagnosis, and the pathologist must always be ready to recognize the limits of the method.

3. *Polyps and submucous fibroids of the uterus*:

Malignant changes in these can be recognized. Recently we have examined a degenerating, polypoid fibroid in a woman long past the menopause in which sudden repeated hemorrhage pointed to new growth. Paraffin sections bore out the frozen section diagnosis of a benign condition.

4. *Lesions of the vulva*:

A section through the base of a deep ulcer will determine whether it is cancer or simply inflammatory or tuberculous. A positive Wassermann reaction does not mean necessarily that the lesion under observation is syphilitic any more than that a positive von Pirquet reaction means tuberculosis. In a case seen not long ago, in a woman of twenty-four years, there was a large deep ulcer of the labium, with a very thick base, which dated back six months to what had been diagnosed as gonorrhea of Bartholin's gland. Frozen section showed extensive inflammatory changes and areas of typical carcinoma. A radical operation was done and the glands in the groin were also found to be involved. A Wassermann was not made in this case, as there was no history pointing to syphilis and at the same time the surgeon felt that even a positive Wassermann would not exclude cancer in the way that a microscopical examination would.

5. *Lesions of the tongue, mouth and lips*:

In this region there has been, in several instances, a call for a diagnosis where a positive Wassermann had been obtained, but the clinical picture pointed more to carcinoma and it has been possible to differentiate specific granulomas from new growth. In another type of case sent to us for ordinary examination (not by frozen section), an ulcer of the buccal wall together with the cervical lymph nodes, all removed for carcinoma, the sections showed tuberculosis. Here cancer could have been readily excluded at the time of operation by frozen section.

6. *Intraabdominal lesions*:

Here the frozen section has little value, as the surgeon is so limited in his radical procedures even when he knows that the lesion is malignant.

In conclusion:

In special regions of the body, as indicated above, where radical measures can follow a diagnosis of malignant tumor we believe that a frozen section will be a distinct help to the surgeon. The pathologist who attempts such diagnoses should appreciate the difficulties and limitations of the method and should know when to confess his inability to make a positive report, and finally all tissues examined by frozen section should later be run through paraffin or celloidin so as to confirm or correct the first diagnosis.

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PHYSICAL AGENTS IN THE TREATMENT OF CANCER.

By WORTHINGTON SEATON RUSSELL, M.D.,
New York.

It is universally believed by careful and experienced observers that the early and thorough surgical operation offers the greatest degree of success in the treatment of malignant growths.

Excellent results are following the active propaganda that is being carried on in this country, particularly at this time, to convince not only the laity, but the profession as well, of the necessity of removing all sources of chronic irritation, no matter how innocent they may appear to be, and likewise of extirpating *all* growths immediately upon discovery.

The policy of waiting to see if a neoplasm will become malignant is of the gravest danger to the patient. Why wait? The time to remove the growth, especially if it is subjected to irritation, is before it assumes a malignant character. Every day of waiting increases the possibility of inoperability.

In spite of the campaign against cancer the majority of patients seek help from the cancer specialist too late for the complete operation. Notwithstanding that they have come too late, something must be done to relieve these unfortunates. Many times an operation in conjunction with the use of some of the other measures at our command, even though a cure be impossible, will lessen pain, prolong life and remove a condition distressing to patient, family and friends. Oftentimes the seemingly hopeless patient has surprised the operator by living many years in comparative comfort. The employment of these measures, without a surgical extirpation where it is inadvisable, may result in an amelioration of the symptoms. Neither can help be refused the many patients who dread the knife and refuse operation. The surgeon after earnestly advising the patient to submit to it must use some of these other measures if his advice is unheeded—his responsibility does not end with the patient's refusal.

Among these procedures are to be included the physical agents, most of which, with the exception of the x-ray, radium and other radio-active substances, utilize the electric current or heat. The most important are the fulguration of de Keating-Hart, destructive fulguration, the electro-thermic coagulation of Doyen, the desiccation of Clark, thermo-radiotherapy, the Percy method, as well as other cauteries. Brief mention only can be made of these different methods; for a full description the reader is referred to "The Cancer Problem," by Bainbridge.

Fulguration—and by fulguration is meant the method of de Keating-Hart—is the employment of a powerful mono-polar current of high frequency obtained from a specially constructed apparatus. A spark of from 12 to 30 centimeters in length is allowed to strike over the bottom of the wound, from which all macroscopic cancer has been surgically removed. The method is indicated only in those cases in which it is possible to excise with the knife all visible growth. Where it is not possible to remove all of the mass the method is only palliative and not curative. The spark causes the cancer cells remaining in the fulgurated area to undergo retrogressive changes, eventually ending in their death, due to an interference with nutrition. The current does not act as a cauterant—there is no destruction of the tissue. In suitable cases the method has given some remarkable results at the New York Skin and Cancer Hospital, where, under the direction of the Research Department, this and the other procedures here mentioned are being thoroughly tested.

Destructive fulguration is distinctly different from the fulguration of de Keating-Hart. A short spark of a high frequency current is used for the purpose of destroying the growth. It is of value for cauterizing such benign neoplasms as warts, moles and pre-cancerous conditions, but the writer believes it inadvisable to use it for removing malignant growths unless it is possible to destroy the entire area of the disease. It cannot be used for destroying large masses.

The electro-thermic coagulation of Doyen is employed chiefly in cancer of the skin and mucous membranes. Currents of high frequency are utilized for destroying the neoplasm by coagulation of the tissue. The patient is insulated in a thick rubber pad; a large electrode is placed over the abdomen while a small electrode is brought in direct contact with the diseased tissue. The elec-

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tric current produces a high temperature which causes a coagulation of the tissue to any desired depth, depending upon the strength of current and the time of contact. It has been shown that cancer cells are much less resistant to heat than are the normal cells for they are destroyed by a temperature of from 50° to 55° C., while the tissue cells are resistant up to about 60° C. According to the claim of Doyen, beyond the area of coagulated tissue is a zone in which the cancer cells are destroyed by the heat while the normal cells are unaffected. The method is particularly useful for removing cancer of the tongue and oral cavity, vagina, uterus, rectum, etc. In some cases the active electrode is held a short distance away from the part and sparks are allowed to pass. Doyen terms this bipolar voltaization. It acts as an efficient styptic for surface bleeding and for the destruction of superficial growths, its action being very energetic upon the surface.

Clark, in his desiccation method, employs the current from a large static machine, which is then passed through a high frequency apparatus. The claim is made that the heat produced by the short spark causes a rapid desiccation of the tissue. The method may be used for the destruction of warts, moles, vascular nevi and lesions of similar character.

Thermo-radiotherapy is a procedure of rendering cancerous tissue more sensitive to the x-rays by means of heat. Wherever possible the part is heated by means of currents of high frequency. Two electrodes of equal size are so placed that the tumor lies in the path between them; the current is then passed until the temperature of the growth is raised to 41° or 42° C. The radiosensitiveness of the skin is lessened by cooling it by means of cracked ice. Massive doses of the x-rays are then given through the cooled area. In cases of cancer of a cavity, as the vagina, rectum, etc., the part may be heated by irrigations of hot water. This method is of value in inoperable cases and in recurrent cancer.

Percy uses a cautery to coagulate the cancerous mass. The cautery is heated by the electric current and is brought in contact with the diseased tissue, while the hand, encased in a rubber glove and placed about the tumor, determines when the proper degree of heat has been reached. A number of deaths from hemorrhage have been reported following the coagulation of uterine cancer. In such cases, before coagulation is attempted, the arteries supplying the pelvic organs should be ligated, the so-called starvation ligation with lymphatic block. In this way hemorrhage may be averted. The method differs from the Doyen method in that a single electrode is used in place of the two. This necessitates the forcing of the electrode further and further into the mass as each layer is coagulated. The results are essentially the same.

Since the invention of the Coolidge tube and the cross-fire method of treatment, the field of usefulness of the x-rays has been greatly enlarged. It is scarcely necessary to remind that large doses should be given in treating cancer or there may follow a stimulation of growth. Some surgeons are using irradiation at the time of operation while the patient is still on the table and before the wound is closed, in the hope of destroying any remaining cancer cells. If this be done, the rays should be applied in massive doses over a wide area, in order to reach the cells lying in the distant normal tissue.

Radium, although in use for a number of years, both abroad and in this country, has hardly reached its level in the treatment of malignant neoplasms. Like all new methods it has its enthusiastic advocates who see in it the agent that will revolutionize the treatment of cancer, while on the other side are those that condemn, oftentime with a fair and thorough trial. The final decision must be made by those who use the substance with enthusiasm tempered by scientific scepticism. It will take some years before the final decision can be reached. Improved technic, a larger dosage and a dosage calculated to meet the particular type of growth under treatment will probably help to secure better results. Reports from many observers show that radium will cure angiomata, keloids, and kindred conditions, and will often cause the disappearance of certain superficial malignant neoplasms. In deep seated carcinoma the remedy is still on trial. The prophylactic raying of the operative field has been tried at the London Radium Institute, but a sufficient length of time has not elapsed to judge of its value. The writer has one case operated upon

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by Dr. Bainbridge over a year ago, in which an incomplete operation was performed for carcinoma of the breast, as the patient refused a complete amputation. At the time of operation radium was buried in the wound where the mass had been removed, and as soon as the wound had healed the entire side of the chest was given a series of exposures to radium. There is no evidence of a recurrence.

Various combinations of these methods, with and without operation, are being tried, but it will take years before their value can be determined.

VACCINE THERAPY AS A MEANS OF AVOIDING CHRONIC INFECTIONS AND CANCER DEVELOPMENT.

By G. H. SHERMAN, M.D., Detroit, Mich.

No disease has been more carefully studied than cancer both etiologically and therapeutically during the past decade, but it is only during the last few years that chronic infections caused by the ordinary pus producing organisms have received serious attention as a causative factor. That long continued irritation of tissue cells is a predisposing cause to cancer development has long been recognized. Infecting organisms in cases where immunizing activities are not sufficient to eliminate them certainly act in the capacity of constant irritants, and even where the protracted irritation is of mechanical or chemical origin bacteria gain entrance and aggravate the process.

Malignant disease is most common in the digestive tract, and in these cases pyorrhea of long standing is the rule. Steadman ("Pyorrhea Alveolaris and Cancer," *Dental Cosmos*, July, 1914), after examining one hundred and forty-three cases, found all of them suffering with pyorrhea. Carcinoma of the liver, gallbladder or urinary tract is practically always preceded by localized chronic infections of long standing. Chronic gastritis extending over a number of years precedes stomach cancer. That pyorrhea and localized infections in the nose, throat and sinuses are responsible for remote infections like arthritis, nephritis, endocarditis, cholecystitis, etc., is now well known. From this we may readily infer that similar infections may cause irritation suitable for cancer development in remote parts of the body.

If the deduction that continued irritation over a long period of time as a result of chronic infection is a primary factor in cancer development is correct, then necessarily its prevention may be hoped for by curing these minor infective processes before they become chronic.

When we come to the question of treating localized infections, antiseptics at once suggest themselves. Here we should consider, however, that they are cell irritants, and as irritation is such a prominent etiological factor in cancer it should be avoided. It is possible that the use of strong antiseptics in treating infected areas may as a result of such irritation be one of the causes of the steady increase of malignant disease. Immuno-therapy, on the other hand, offers a means of curing infective processes without localized cell irritation, and from the teachings of experience we find that bacterial vaccines are our best therapeutic immunizing agents, their effect being in entire accord with Nature's methods. The irritated tissues are not in the least disturbed.

The best results are obtained where vaccines are employed in the early stages of acute infections. From my experiences with their use, I am satisfied that if vaccines were resorted to regularly in the treatment of acute infections, they would rarely become chronic. Vaccine users are often criticised for employing them in minor or trivial conditions because most of these will recover spontaneously. The prevalence of chronic infections is a sufficient reply to such criticism. From the viewpoint that these are a predisposing cause of cancer development, vaccine therapy as a means of preventing infections from becoming chronic certainly would be a powerful prophylactic of malignant disease. The proposition is certainly sufficiently promising to deserve a trial, and meantime the patient will also be relieved from the misery that localized chronic infections produce.

3334 Jefferson, E.

Cancer has to-day the largest mortality of any disease of adult life, being in fact exceeded in its mortality only by the infantile diseases and by that of tuberculosis at all ages, and if, as is now believed, by far the greater part of this mortality is readily preventable, there is good reason for the public interest in the subject.—Dr. E. Reynolds (*Bost. Med. and Surg. Jour.*).

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Editorial Department

NEW YORK, JULY, 1915

THE PSYCHOLOGICAL ASPECTS OF THE CANCER PROBLEM.

If the nation-wide educational campaign against cancer that has been so auspiciously inaugurated is to prove a real blessing to humanity it must be conducted with discretion and infinite tact. If, however, it is managed injudiciously so as to excite and spread alarm among the public, instead of a wholesome feeling of caution, the harm that may result is incalculable. There are already too many neurotics, too many victims of imaginary ills, too many persons haunted with a dread of cancer, and the number of these will be materially increased by disregard of the psychological aspects of such a propaganda. There is no place in it for the alarmist. People must be taught that cancer is to a large extent a preventable and curable disease and must be acquainted with the means of prevention and cure, but this should be done by appealing to their common sense and not to their fears. Too much emphasis has been placed upon the alleged marked increase of malignant disease during recent years, which is not at all substantiated by unbiased and careful analysis and interpretation of statistics. The influence of heredity has been greatly exaggerated by some writers, whose sensational statements have caused needless anxiety to many a timid and nervous person. There is no good reason for the belief that diet and occupation (with but few exceptions, particularly workers in pitch, tar or paraffin) play an important part in the etiology of carcinoma. The existence of "cancer houses" has been shown to be a myth, and no tenable evidence has been adduced that the disease is contagious and that those who come in contact with its sufferers must adopt any special precautions. These and some other fallacies must be eradicated, for they serve only to frighten and

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not to enlighten the laity as to the real causative factors. It must also be borne in mind that many persons, including even some members of the medical profession, are still convinced that cancer is a constitutional malady. This belief, which is in itself a source of groundless terror, must be strenuously combated, for it encourages an indifference to precancerous lesions and a spirit of hopelessness as to the permanent value of operative removal. Let us therefore do our utmost to uproot this ancient superstition of cancer being a "blood disease" and people will pay more attention to local conditions, such as warts or moles, "the lump in the breast," the lacerated cervix, ulcers of the lip or tongue, which are so often the starting points or early stages of malignancy. We must take the public into our confidence and frankly confess our inability to determine the period of transition of a benign into a cancerous lesion, and utilize this as an argument for the early removal, as a precautionary measure, of any condition which has been shown to bear a close relation to the development of cancer. But even if there is reason to believe that such a transformation has taken place, the patient's anxiety may be allayed by the assurance that in its incipiency the disease can be frequently cured, with but little chance of recurrence, by timely and radical operation. The task of enlightening the laity on these points will be largely shared by the general practitioner, and he will be much better equipped for this work by a thorough perusal of Dr. Bainbridge's recent work on the "Cancer Problem," which represents the most complete exposition of the present status of malignant disease. Upon the physician's ability to make an early diagnosis will depend in a large measure the success of surgical intervention, and he must be constantly on the watch to detect the frequently insidious and obscure manifestations of cancer and not allow a spirit of optimism to sway his judgment in suspicious cases. It is but natural that the mental attitude of the general practitioner should be somewhat different from that of the specialist whose familiarity with the disease has to a great extent divested it of its terror. To the sympathetic physician it is a hard, a grievous thing to entertain the thought that his patient may be a victim of malignant disease, and unless the symptoms are unmistakable, he will be inclined to temporize and try various forms of medical treatment. This fatal procrastination is justly criticized by the surgeon, since it so often frustrates his efforts to effect a radical cure. While in cancer of the skin, of the superficial organs, and the accessible mucous membranes and body cavities errors in diagnosis should be rare, it is at times difficult and even impossible to detect the disease in its early stages when it attacks the internal viscera. Even here, however, an expectant policy is fraught with far greater risk than an exploratory incision, which will serve not only to establish the diagnosis but, in the absence of cancer, enable the surgeon to remove those conditions of irritation which may subsequently lead to its development. The main object of the present campaign, therefore, will not be attained until every physician is made to realize his responsibilities in the prevention and cure of cancer; until he has been fully impressed with the importance of thorough knowledge of precancerous conditions and familiarity with the danger signals of malignancy, and until he appreciates the vital need of operative intervention at the earliest possible period.

P. J. R.

CANCER CAMPAIGN NUMBER.

In this issue of our Journal will be found a number of articles on various phases of the cancer problem by men who have devoted much attention to the study of malignant disease and are therefore able to speak with authority. To keep alive a constant interest in this campaign, however, we shall from time to time devote liberal space to contributions on this important subject.

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DISEASES OF THE NOSE, THROAT AND EAR FROM THE PRACTITIONER'S VIEWPOINT.

By JAMES JOSEPH KING, A.B., M.D., New York.

Attending Laryngologist, Hospital for Ruptured and Crippled; Chief-of-Clinic, Ear, Nose and Throat, Gouverneur Hospital; Clinical Assistant in Otology, New York Eye and Ear Infirmary.

(*Continued from June Issue.*)

THE TONGUE DEPRESSOR AND EXAMINATION OF THE MOUTH.

Two types of tongue depressor (which is a tongue controller as well) will serve all ordinary purposes. The narrow blade model of Fraenkel is a good instrument for most tongues. For the broad, thick, strong, unruly tongue, a wide blade

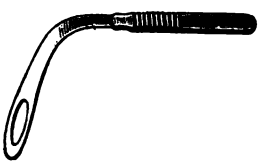


Fig. 21. Tongue depressor. A useful broad bladed model—no hinge joints, and can be readily sterilized.

is better. For contagious diseases, such as tuberculosis, syphilis, diphtheria, etc., the wooden blades adopted by the New York Board of Health are excellent. They are inexpensive, and are burned after being used once.

Considerable skill is required in employing a



Fig. 22. Structures within the mouth as seen when it is opened and the tongue depressed. 1. The tongue. 2. The posterior pharyngeal wall (the oropharynx). 3. The soft palate. 4. The uvula. 5. Right anterior pillar of the fauces. 6. Left anterior pillar of the fauces. 7. Right posterior pillar of the fauces. 8. Left posterior pillar of the fauces. 9. Right tonsil (faucial tonsil). 10. Left tonsil (faucial tonsil). From "Diseases of the Nose and Throat," Coakley.

tongue-depressor, but it may be acquired by observing the following points, as laid down by Coakley:

"1. The mouth should be opened to nearly the full extent.

"2. The patient should be told to allow the tongue to rest within the mouth (many patients, as soon as they open their mouths protrude the tongue). Attempts at depression with the tongue protruded result in injury to the tongue and spasm of the organ, with insufficient depression.

"3. If one carefully observes the tongue while lying quietly within the opened mouth, he will see that it is arched from before backward. If the end of the tongue-depressor be placed in front of the highest point in the arch of the tongue, only the anterior portion will be depressed; the parts behind the tip of the tongue-depressor will rise and obscure the field of vision more than if no depressor were used. On the other hand, if the tip of the depressor passes much beyond the highest point of the arch, then

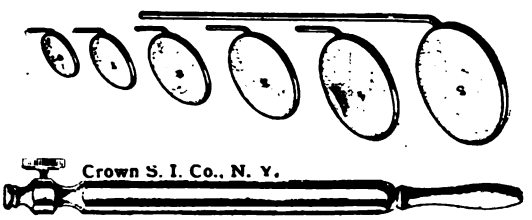


Fig. 23. Throat mirrors and handle adjustable for any size. The most useful sizes are Nos. 1, 3 and 5.

the tongue instead of being depressed directly downward will be pushed backward as well as downward. The tongue cannot be pushed backward to any extent without producing gagging.

"The proper procedure, then, is to pass the depressor into the mouth, carefully avoiding touching any of the tissues, particularly the upper surface of the tongue, until the tip of the tongue-depressor passes about one-eighth of an inch beyond the highest point in the arch of the tongue; then gradually lower the depressor and make gentle steady pressure upon the organ. Do not slide the depressor over the surface of the tongue.

"4. Keep the depressor in the median line.

"5. Avoid using too great pressure, for in so doing there is sufficient space along the floor of the mouth for the depressed tongue and it is again forced backward, with the inevitable gag."

With the tongue properly depressed and the mirror in the proper place and with good illumination, the naso-pharynx, the entrance to the eustachian tubes, and the posterior nares (including the posterior ends of the middle and inferior turbinates) may be inspected.

The base of the tongue is examined, with the patient in the position as described for posterior rhinoscopy. The mouth is opened and the

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tongue protruded. The examiner then places around the tip of the tongue a small piece of gauze and seizes it firmly but gently with the thumb and index finger, or the patient may hold the tongue himself. The gauze is necessary, as the tongue is too slippery to be held with the fingers alone. A large size mirror, number 3 or 5, is held as for posterior rhinoscopy, excepting that the reflecting surface of the mirror is turned downward. Care must be exercised not to irritate the uvula and pillars of the fauces, for if this is done gagging will be produced. In the examination, the lingual tonsil and a varix of veins will be observed. It is often desirable to steady

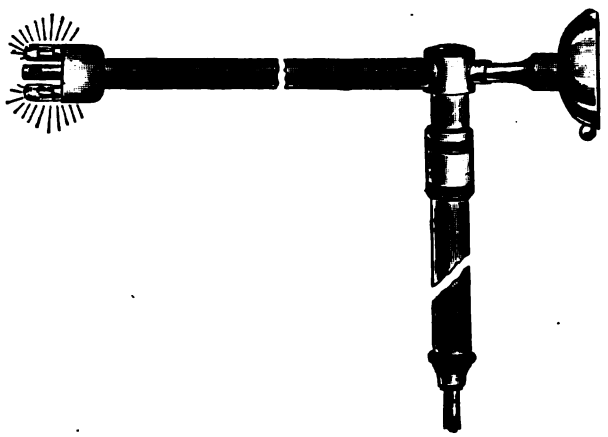


Fig. 24.

the hand by resting the fingers on the side of the cheek.

EXAMINATION OF THE LARYNX.

This is accomplished by holding the tongue and mirror as for examination of the base of the tongue, and the light is reflected with the head mirror so that it is thrown upon the pharyngeal wall. When the mirror is first introduced, the patient is told to breathe quietly and naturally. He is then instructed to throw his head backward without inclining the body backward. The tendency is for most patients to throw the whole trunk backward. The mirror is warmed as for posterior rhinoscopy.

By this examination the condition of the epiglottis, the vocal cords, and the cartilages of the larynx and its walls is observed. The vocal cords should be observed in quiet respiration, in deep respiration, and in phonation. In deep inspiration the cords will be widely separated so that often several rings of the trachea may be observed. After I have observed the larynx during quiet respiration, I instruct the patient to utter a high note by saying "ee," then a low note by saying "a", and lastly to take a deep inspiration. These movements of the larynx enable me to rapidly make a complete examination. This examination must be made rapidly, as most patients gag if the mirror is kept in place too long. The tongue should be held in a line at right angles to the teeth.

The Hays' electric pharyngoscope is a very useful little instrument for the direct examination of the larynx. The Holmes' naso-pharyngo-



Fig. 25. Holmes' nasopharyngoscope.

scope is useful for examination of the nose and accessory sinuses. These electric-light instruments help very materially in the examination



Fig. 26. Crown universal light.

of certain cases, and with them it is often possible to gain information which is very difficult to obtain by the ordinary methods of examination.

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THE CLINICAL VALUE OF THE COMPLEMENT FIXATION TEST IN SURGICAL TUBERCULOSIS.*

By HENRY KELLER, M.D.,
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AND
A. J. MORAVEK, M.D.,
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INTRODUCTION.

The tubercle bacillus adopts various modes of invading the human system. At times he enters like a prince heralded and accompanied by his courtiers and retinue of concomitant symptoms and signs pathognomonic of tuberculous disease. At other times he prefers a pauper-like method of invasion, *i. e.*, bereft of all pomp and ceremony, occupying but an obscure place and biding his time until his host, through illness, overwork or general debility from whatever cause, is in a receptive mood, and then he makes his presence known.

There is still another method of invasion which the tubercle bacillus very frequently assumes, especially in surgical tuberculosis, namely, the "Imposture Method." Disguised and garbed in symptoms borrowed from the streptococcus, gonococcus, influenza bacillus or diplococcus rheumaticus, the tubercle bacillus very often succeeds in doing irreparable damage to the part invaded before the deception is discovered.

Such cases at times require the ingenuity of a Sherlock Holmes to detect the causative factor, and any aid from whatever source should be of inestimable value. In the Complement Fixation Test for Tuberculosis, we venture to say, we have found that aid.

T. B. COMPLEMENT FIXATION TEST; THEORY (A. J. M.).

When an antigen, that is, a substance which can induce the formation of an antibody, is placed in contact with inactivated serum containing the specific antibodies and also with fresh normal serum (complement), there is a union of the specific antibody with the antigen, and that this combination takes up the complement is made evident by the fact that the combination after standing a suitable time is in spite of its complement content no longer able to bring into solution red corpuscles which have previously absorbed hemolytic amboceptors, because before this hemolysis can be induced the hemolytic amboceptors must unite with free complement. The complement having already been united with another amboceptor is not free to join with that of the charged red corpuscles.

The complement fixation test can be used to determine, just as in Wassermann test, the presence of different proteids and of bacterial products in the serum of a person suffering from a tubercular infection.

The Necessary Apparatus: Test tubes, about 10 mm. in diameter, and pipettes, graduated 0.01 c.c. and 0.1 c.c., all sterilized. 0.90 per cent. sterile salt solution.

(a) Serum of a patient must be inactivated.

(b) Fresh guinea-pig serum to supply the complement. This must be freshly prepared, shortly before use, and kept on ice, as it keeps only 24 hours.

(c) 5 per cent. suspension in 0.90 per cent. salt solution of red ox blood cells.

(d) Clear solution of antigen which produces the antibody to be tested, prepared from T. B. culture or T. B. tissue.

Antigen should also be freshly prepared, if possible.

Preparation of an antigen from tubercular liver is as follows: A piece of the organ is rubbed up in a mortar with fine sterile sand and 95 per cent. alcohol is added in the proportion of 45 c.c. to 15 grains of organ, and the mixture is placed in a flask and warmed in a water-bath at not less than 60 C. and not more than 65 C., for about an hour, then filtered and kept in a cool place. This preparation will retain its strength two weeks. The following simplified method may also be used:

Simplified Method: Scrape the growth of T. B. culture (agar-glycerine, 15 days' culture, or glycerine-egg, 10 days' culture) into two test tubes and add 2 c.c. of NaCl solution to each tube. Inactivate this at 50 or not more than 60 C. for 30 minutes. Then allow to stand at 37 C. for 6 hours.

After this is done, centrifugalize and pipette off the supernatant fluid which is placed in sterile bottle. Keep in ice-box. Add a few drops of lysol as preservative.

Titrate antigen against the serum of a patient. The amount of antigen to be used is that which will completely inhibit hemolysis of a suspension of

* Read before the Clinical Society of the Polyclinic Hospital, May 8, 1915.

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corpuscles in the presence of a definite amount of positive serum and complement, provided that double this amount does not interfere with complete hemolysis of the cells, using normal serum and complement.

Control. Before carrying on the test the following controls are necessary:

1. To titrate the amboceptor in order to determine the smallest amount to cause hemolysis.

2. To standardize the complement.

3. To determine that the extract by itself does not fix the complement or cause hemolysis.

Simple Method of Making the Test (simplified) A. J. M.: Take 6 clean sterile test tubes. In the first two is placed 1 drop each of the patient's serum which is to be tested; in each of the second two tubes (control) is placed 1 drop of the serum of a patient surely tuberculous, and in each of the third two test tubes 1 drop from normal person and these third two tubes serve also as a control. Then to each of the six tubes is added 0.5 c.c. of a guinea-pig serum, to furnish complement. Then into *one* (only) of each of the three pairs of tubes is put the antigen (0.5), *the second tube of each pair receiving no antigen.*

Shake well and incubate at 37 C. for one hour, and no more than two hours, and at the end of incubation, add the amboceptor and shake, mixing this well, and keep another two hours at the temperature of 37 C. Then remove from the water bath and keep in room temperature for 12 hours, and read.

Titration of the Amboceptor: In a few tubes is placed 1 c.c. of 5 per cent. suspension of ox blood cells, 0.1 c.c. of complement serum and a small amount of the inactivated amboceptor serum against ox or sheep blood. Serum is diluted with 0.90 per cent. salt solution in order to make this more easy to measure, one hundred-fold and one thousand-fold, and then taking the series of fractions 0.1 c.c. of these dilutions. The contents are brought up to the same volume by the addition of 0.90 per cent. salt solution and after thorough mixing, the tubes are placed in a water bath at 37 C. for two hours. The smallest amount of amboceptor which will cause complete hemolysis is then determined, and double this quantity is used in the further tests.

The hemolytic serum should be sufficiently strong that the amount used is not more than 1-1000 or 2-1000 of 1 c.c.

THE SPECIFIC VALUE OF THE TUBERCULOUS COMPLEMENT FIXATION TEST.

In order to find out its specific value it was necessary to select a number of clinically sure cases of tuberculosis, as borne out by the history, laboratory aids, etc.; also a number of control cases—patients suffering from diseases other than tuberculosis, and normal individuals free from any ailment. It was further necessary to ascertain whether a patient, in order to give a positive tuberculous complement fixation, must suffer from an active disease at the time, or whether it only indicated that the individual had had a tuberculous infection at some time or another, and since the majority of adults have had a tuberculous infection, the test would then be of no specific value.

PERSONAL RECORD OF TUBERCULOUS COMPLEMENT FIXATION TESTS TO APRIL 29, 1915.

Active cases of tuberculosis, 50: Positive, 38. Negative, 10. Minus plus, 2.

Cured cases, 14: Positive, 1. Negative, 12. Minus plus, 1.

Dubious cases, 6: Positive, 0. Negative, 5. Minus plus, 1. (cervical adenitis).

Control cases, 13: Positive, 0. Negative, 13.

Subsequent history of the dubious cases: One turned out to be gonorrheal arthritis of the left hip reacting positively to gonorrheal antigen. Two proved to be syphilitic, giving a positive Wassermann reaction. One still remains doubtful, and the other two were lost sight of.

Location of disease in which tuberculous complement fixation was positive:

Larynx	2 cases.
Cervical glands	1 "
Lungs	3 "
Shoulders	2 "
Spine	3 "
Sacro-iliac	2 "
Hips	7 "
Knees	6 "
Ribs	1 "
Ankle and knee	1 "
Tarsus	1 "
Multiple surgic. tuberc.	1 "
Kidneys	6 "
Testicle	1 "
?	1 "

Age of those whose blood findings were positive: Youngest, 6 years. Oldest, 59 years.

Duration of disease (active) of those with positive finding in the blood: Shortest, 6 weeks. Longest, 7 years.

Duration of disease in those patients with active disease and negative blood finding: Shortest, 4 weeks. Longest, 5 years. Had an Albee's operation six months ago by Dr. R. Whitman.

ADDITIONAL LABORATORY TESTS IN OUR SERIES OF CASES.

Wassermann Tests: This is important because the tuberculous antigen may, according to some observers, give a positive fixation test with normal serum, and also frequently syphilitics react positively, and in that way may be mistaken for disease (tuberculous).

Wassermann and complement fixation tests for tuberculosis. Results in active cases, 15: Negative Wassermann, 14; positive Wassermann, 1 (improved on specific treatment).

T. C. fixation and Wassermann negative, 4. T. C. fix-

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ation positive and Wassermann negative, 10. Wassermann positive and fixation minus-plus, 1.

Wassermann test in cured cases, 1 negative. Wassermann tests in dubious cases, 5. Results: Wassermann positive, 2; Wassermann negative, 3.

In control cases, 7. Results: Tuberculous complement fixation tests, 0. Wassermann positive, 1. Wassermann plus minus, 1.

Hence four cases of syphilis with a positive Wassermann gave a negative finding with tuberculous complement fixation test, showing that the reaction is highly specific.

Gonorrheal complement fixation tests:

(a) In control cases 5: Positive, 2; negative, 3.

(b) In dubious cases, 1 positive.

Sputum examination for tubercle bacilli, 4 positive; 3 with active disease of the apices; 1 with osteoarthritis of the spine and apical involvement.

Urinary examination for tubercle bacilli. About 50 per cent. of our series of cases had the urine examined for the presence of tubercle bacilli and cultures made.

In our entire series of cases we could not detect any tubercle bacilli except in two patients with joint disease and the six cases of kidney tuberculosis. The latter had been examined in the G. U. Department of the Post-Graduate Hospital and the urine obtained by ureteral catheterization.

Feces examination. Cases with active disease whose feces were examined for tubercle bacilli together with a blood complement fixation test for tuberculosis, 31. Results: Positive in feces and blood, 19; positive in blood and negative in feces, 7; negative in both, 5.

Number of cured cases whose feces were examined while the disease was in active stage, 3. Result: Tubercle bacilli were found in all.

Cases with cured disease whose feces were examined for tubercle bacilli together with a blood complement fixation, 8. Results: Finding of acid fast bacilli, 0; tuberculous complement fixation test, 0.

In dubious cases three specimens of one patient, negative.

In control cases, specimens obtained from three different patients were examined and cultures made with negative results.

The influence of tuberculin injection upon the tuberculous complement fixation test. From our observation upon a number of cases it seems to have no influence *per se.* It depends altogether upon the fact whether the patient is cured or not. Thus, number of cases having received tuberculin treatment prior to the withdrawal of the blood for complement fixation test, 14. Results: Negative, 5; cured, 3; 1 mild case and one with doubtful diagnosis. Positive, 8, all being active cases. Minus plus, 1; cured.

THE CLINICAL IMPORTANCE OF T. C. FIXATION.

The clinical importance of the test can best be shown by citing a few actual cases.

1. F. M., 13½ years old, male, Polyclinic Hospital. Sent into the hospital with the diagnosis of osteomyelitis of the outer condyle of femur of left limb.

History. Sudden onset after injury. Six weeks' duration. No deformity of knee, temperature 103 degrees on admission and severe pains around joint.

Referred to Dr. Bonime for tuberculin injection for diagnostic purposes. Result of first injection, negative.

The blood withdrawn on March 1, 1915, prior to tuberculin injection, and tested for tuberculous complement, at the request of Dr. Bonime: Result, positive.

Against our findings the joint was opened with the idea that it was a suppurative condition, and the findings have substantiated our diagnosis.

2. J. Sh., male, 36 years, Ireland, married, a patient at the Post-Graduate Hospital. Has had laryngeal trouble for the last two years. Clinical diagnosis: Syphilitic laryngitis.

Physical examination by Dr. R. Abrahams: Patient's heart and lungs were found to be normal. Urine negative for tubercle bacilli.

Specific treatment unsuccessful.

Wassermann taken April 16, 1915, at P.-G. laboratory, negative.

Tuberculous complement fixation test by A. J. Moravek, April 29, 1915: Positive, bovine; negative, human.

Under observation in Dr. Guiteras' clinic.

3. B. McL., female, 28 years, U. S.; in the service of Dr. W. B. Thompson at the Polyclinic Hospital.

Diagnosis: Infective arthritis of left hip, probably Neisserian.

History: On July 11, 1913, she felt a sudden pain in the left side, mostly in the groin, and for five weeks had been treated at various institutions for neuritis. She then came under the observation of Dr. Morgan, who diagnosed the case as an arthritis of the left hip of Neisserian origin, and transferred patient to Dr. W. B. Thompson, who has had charge of her ever since.

Venereal history, negative. Smears taken from cervix, vagina and urethra and examined for gonorrhea, negative. Von Pirquet, negative.

Symptoms and signs at commencement of treatment: Pains in the left hip—tendency to adduction and spasm of muscles. No atrophy of the muscles of the thigh.

On April 21, 1914, Dr. Thompson removed the plaster spica which she had on, and told her to return for observation. She soon began to suffer from a recurrence of pains in the hip and a return of the spasm of the muscles of the thigh.

At the request of Dr. Thompson we have examined the urine, feces and blood.

Results: Feces showed presence of acid fast bacilli in smears and cultures. The cultures were injected into a guinea pig and the pig developed tuberculosis.

Blood examination: Tuberculous complement fixation test, positive.

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Urine: Negative for tubercle bacilli.

As a result of the findings she was again placed in a plaster spica and has improved ever since.

There is, however, something of greater importance in the complement fixation studies for tuberculosis which should be emphasized, namely: To discover the nature of the infecting organism, whether it is a human or a bovine type.

In our studies of the active cases we found that out of the positive 34 only 29 were due to the tubercle bacillus of the human type, and 9 were bovine, i. e., reacting to the respective antigen exclusively. Few of the 29 reacted to both.

Our finding of the human and bovine types seems to bear out the contention of N. Raw, "that man is attacked by two distinct types of tuberculous infection, one conveyed by a tuberculous person, the human type, and the other by infected milk or meat, the bovine type. Primary pulmonary phthisis seems to result from inhalation of the human bacillus, and tuberculous ulceration of the intestines to result secondarily from the swallowed sputum. Tuberculous cervical adenitis, peritonitis, joint disease, and probably meningitis and lupus are caused by the bovine bacillus, absorbed from the digestive tract. While the human bacillus produces ulceration of the intestines, the bovine type passes through the intestinal wall and attacks the mesenteric glands, whence the infection spreads to the lungs. The cervical glands may become infected from the tonsils, the bacillus being conveyed to them directly by the milk. The infection may remain limited to the glands or spread downward and cause an extensive bovine infection of the lungs." *

Our finding, however, of some active cases whose blood reacted to both antigens, bovine and human bacilli, seems to be at variance with the conclusion of Raw, that the bovine and human forms of tuberculosis are antagonistic in the human body, and our future task will be to investigate the validity of Raw's findings.

Conclusions Drawn From Our Studies.

1. In surgical tuberculosis before there is an appreciable lesion, the complement fixation for tuberculosis is usually negative.

2. In cases with an appreciable lesion with lack of symptoms and signs pathognomonic of the disease, the complement fixation test for tuberculosis is of great diagnostic value.

3. While active disease is present, the tuberculous complement fixation is present in 76 per cent., and therefore no patient should be discharged as cured before his blood has been examined for tuberculosis at least twice, for it may happen at times that the first specimen may be negative and the second positive. This was our actual experience in a few cases.

4. Normal individuals, even if they have had a small tuberculous infection which healed and calcified, will invariably give a negative complement fixation test for tuberculosis, differing in that way from tuberculin.

5. The complement fixation test for tuberculosis is a more delicate test than the Wassermann and more reliable, if done by the proper man trained for the work.

6. By the complement fixation test we are able to determine whether the patient is afflicted with tuberculosis of the human or bovine type, which is of great clinical importance from a prognostic point of view.

Our conclusions regarding the specificity of the T. C. Fixation tally with the conclusions of McIntosh and Filders (*Lancet*, Aug. 22, 1914) in their studies of the same problem.

Source of Clinical Supply for the Investigations.

Forty-six patients were gotten from the Orthopedic and Surgical Departments of the Polyclinic Hospital.

Dr. Bonime has been kind enough to place patients of the Sero-Therapy Department at our disposal.

Fifteen cases were supplied by the Orthopedic Department of the Roosevelt Hospital.

Five cases were gotten from the Post-Graduate Hospital through the courtesy of Dr. R. Guiteras.

The rest were supplied by Dr. A. J. Moravek, Dr. J. Radda, Dr. Kimball and myself, from private sources.

In closing, we wish to express our thanks to the staff of the Orthopedic Department and the Surgical Department of the Polyclinic Hospital, and the Serological Department of the Roosevelt Hospital, for their courtesy and invaluable assistance.

* Jour. State Medicine, London, XII, abstracted by Nichols, Am. Jour. Diseases of Children, February, 1915, Vol. 9.

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COMPLEMENT FIXATION TEST FOR TUBERCULOSIS OF JOINTS, ETC.

	NAME	AGE	SOURCE	DIAGNOSIS	T.C.F.	T.B. IN FECES
1.	Ch. L.	21 yrs.	Private	Sacro-iliac tuberculosis. 6 mos. duration.	Positive	Positive
2.	B. K.	23 yrs.	Polyclinic	Tuberculosis of left sacro-iliac. 9 mos. duration.	Positive	Positive
3.	Th. McL.	9 yrs.	Polyclinic	Tuberculosis of left knee. 2 yrs. duration.	Positive	Negative
4.	J. C.	34 yrs.	Roosevelt Dr. F. H. Albee	Osteoarthritis of spine (tuberc.). 3 yrs. duration.	Positive	Positive
5.	R. P.	16 yrs.	Polyclinic	Tuberculosis of ankle and left tarsus. 9 mos. duration.	Positive	Positive
6.	G. S.	6 yrs.	Polyclinic	Tuberculosis of left hip. 6 weeks duration, with abscess.	Positive	Negative
7.	P. M.	23 yrs.	Polyclinic	Tuberculosis of hips. 12 mos. duration.	Positive	Positive
8.	Th. O.	9 yrs.	Polyclinic	Tuberculosis of left hip. 2 yrs. duration, under control.	Positive	Positive
9.	Wm. D.	18 yrs.	Polyclinic—Dr. W. B. Thompson	Cured T.B. of knee (exacerbation due to trauma) 10 yrs. duration.	Positive	Negative
10.	M. F.	20 yrs.	Polyclinic	Tuberculosis of left shoulder. 1½ yrs. duration.	Positive	Positive
11.	S. A.	25 yrs.	Polyclinic	Tuberculosis of right hip (sinuses). 2½ yrs. duration.	Positive	Positive
12.	M. M.	8 yrs.	Polyclinic	Tuberculosis of left knee. 4 yrs. duration.	Positive	Positive
13.	Miss McL.	28 yrs.	Polyclinic	Infect. arthritis of left hip, with sudden onset. Misleading symptoms. 1 yr. duration.	Positive	Positive
14.	J. S.	9 yrs.	Polyclinic	Tuberculosis of right ankle and left knee. 4 yrs. duration.	Positive	Negative
15.	T. C.	14 yrs.	Polyclinic	Tuberculosis of left knee (sinuses). 2 yrs. duration.	Positive	Not examined
16.	Ch. L.	19 yrs.	Polyclinic	Cured tuberculosis of knee since childhood. Now has pains in hip. Few weeks duration.	Positive	Not examined
17.	T. S.	31 yrs.	Post-Graduate	Tuberculosis of left kidney & bladder. 1 yr. duration.	Positive	Not examined
18.	M. J.	28 yrs.	Polyclinic	Tuberculosis of left hip, with acute exacerbatia. 4 yrs. duration.	Positive	Absent
19.	E. F. A.	37 yrs.	Polyclinic	Tuberculosis of lower dorsal vertebræ. 6 mos. duration.	Negative; 2nd exam. pos.	Pos. culture
20.	A. S.	30 yrs.	Roosevelt	Tuberculosis of lower lumbar, with psoas abscess. 2 mos. duration.	Negative	Absent
21.	R. K.	3 yrs.	Polyclinic	Tuberculosis of right ankle. 9 mos. duration.	Negative	Negative, but many staphylococci and streptococci
22.	S. G.	9 yrs.	Roosevelt	Tuberculosis of left knee, fully ankylosed. Traumatic history. 1 yr. duration.	Negative	Specimen not obtained
23.	G.	11 yrs.	Polyclinic	Tuberculosis of left hip. Still active. 2 yrs. duration.	Negative	Specimen not obtained
24.	Mrs. B.	36 yrs.	Polyclinic	Tuberculosis of 3rd lumbar. 3 yrs. duration.	Positive; neg. after Albee operation.	Positive
25.	Mrs. E. P.	39 yrs.	Roosevelt	Mild tuberculosis of left ankle. 1 yr. duration.	Negative	Specimen not obtained
26.	"	"	"		Neg. after 7 injections of tuberculin 4 days apart	Specimen not obtained
27.	V. A.	8 yrs.	Polyclinic	Tuberculosis of right hip. Turned out to be a rheumatic hip. Also child developed chorea as complication.	Negative	Negative
28.	S.P.	42 yrs.	P. G. (G. U.)	Tuberculosis of kidney and bladder. Duration ?	Positive	Positive
29.	J. F.	19 yrs.	Dr. Radda's patient	Tuberculosis of kidney. Duration ?	Positive	Positive
30.	S. B.	?? yrs.	P. G. H.	Tuberculosis of kidney. Duration ?	Positive	Positive
31.	Mrs. C.	?? yrs.	Dr. Radda's patient	Tuberculosis of kidney and bladder. 4 yrs. duration.	Positive	Positive
32.	Miss H.	26 yrs.	Dr. Bonime at Polyclinic	Tuberculosis of kidney. Gave strong reaction to tuberculin. Duration ?	Positive	Negative
33.	A. B.	38 yrs.	Dr. Bonime at Polyclinic	Tuberculosis of left knee. 2 yrs. duration.	Negative. 2nd exam. Feb. 24, pos. to Bovine	Positive
34.	J. R.	21 yrs.	Dr. Bonime at Polyclinic	Pott's disease of lower dorsal. Albee's on Sept. 22, 1914, by Prof. Whitman. 5 yrs. duration.	Negative	Positive
35.	R. S.	32 yrs.	Dr. Wallace's at Polyclinic	Tuberculosis of right sacro-iliac. 6 mos. duration.	Negative; 2nd exam. + —	Negative
36.	J. G.	20 yrs.	Dr. Bonime at Polyclinic	Pulmonary tuberculosis. Sputum positive. 14 mos. duration.	Positive	Negative
37.	M. P.	57 yrs.	Dr. Bonime at Polyclinic	Tuberculous osteomyelitis of ribs. Almost cured. Had tub. kidney removed by operation. Duration ?	Weakly positive	Negative
38.	M. D.	38 yrs.	Dr. Bonime at Polyclinic	Tuberculosis of cervical glands and 4th and 5th ribs of right side and sinuses. Duration ?	+ Bovine — Human	
39.	F. C.	17 yrs.	Dr. Bonime at Polyclinic	Tuberculosis of right shoulder and incipient T.B. of right apex. received 60 injections of tuberculin. On the verge of being discharged as cured. Duration ?	+ Bovine — Human	
40.	F. M.	13½ yrs.	Dr. Bonime at Polyclinic	Osteitis of inner condyle of right femur. 6 wks. duration.	Positive	Pos. culture
41.	F. J.	49 yrs.	Dr. Bonime at Polyclinic	Pulmonary phthisis of left apex. 1 yr. duration.	+ Human — Bovine	Pos. culture
42.	J. S.	59 yrs.	Polyclinic Orthopedic	Pott's disease mid-dorsal. Also tub. testicle; r. kidney removed for tuberculosis. Pott's disease 6 mos. duration; kidney T.B. 5 yrs. duration.	+ Bovine — Human	Pos. culture
43.	S. G.	19 yrs.	Dr. Bonime at Polyclinic	Tuberculosis of clavicle, hip, knee and right ankle. 7 yrs. duration.	+ Bovine — Human	Negative
44.	M. M.	10 yrs.	Harlem Disp. and Polyclinic	Arthritis of left hip joint. Tub. atrophy spasm of muscles and tendency to deformity. 4 wks. duration.	Negative	Negative

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45.	J. H.	37 yrs.	Dr. Bonime at Polyclinic	Tubercular laryngitis. 64 injections of tuberculin. 2½ yrs. duration.	+ Bovine — Human	Specimen not obtained
46.	L. V.	20 yrs.	Polyclinic	Tuberculosis of left hip (acute). Sudden onset. 8 mos. duration.	Negative	Specimen not obtained
47.	J. S.	28 yrs.	Dr. Radda's (Private)	Tuberculosis of testicle. 6 mos. duration.	+ Bovine — Human	Specimen not obtained
48.	J. S.	36 yrs.	Post-Graduate Dr. Guiteras	Syphilitic laryngitis. 2 yrs. duration.	+ Bovine — Human	Specimen not obtained
49.	Mr. G.	?? yrs.	Dr. Kimball's case	Pulmonary phthisis. Duration ?	+ Human — Bovine	Specimen not obtained
50.	Mr. B.	?? yrs.	"		— Human + Bovine	Specimen not obtained

TUBERCULAR COMPLEMENT FIXATION OF CURED CASES OF TUBERCULOSIS OF JOINTS, ETC.

	NAME	AGE	SOURCE	DIAGNOSIS	T.C.F.	T.B. IN FECES
1.	J. C.	7 yrs.	Roosevelt	Tuberculosis of right knee. 3 yrs. duration. Subsided.	Negative	Positive (while active)
2.	E. L.	19 yrs.	Polyclinic	Tuberculosis of right hip joint. 14 yrs. duration. Cured.	Negative	Specimen not obtained
3.	J. McL.	12 yrs.	"	Tuberculosis of right knee. 9 yrs. duration.	Positive	Specimen not obtained
4.	Wm. D.	14 yrs.	Roosevelt Dr. F. H. Albee	Pott's disease of lower dorsal. Albee's operation 3 yrs. ago. 10 yrs. duration.	Negative	Negative
5.	Ch. B.	12 yrs.	Polyclinic	Tuberculosis of right hip. 3 yrs. duration.	Negative Oct. 15, '14	Positive (while active)
6.	A. C.	8 yrs.	"	Tuberculosis of left hip. 2½ yrs. duration.	Negative	Positive (while active)
7.	E. H.	19 yrs.	"	Tuberculosis of left elbow. 3 yrs. duration.	Negative	Specimen not obtained
8.	F. E.	?? yrs.	"	Cured pulmonary tuberculosis (2 yrs.) and pains in cervical vertebræ. X-ray negative. 2 mos. duration.	(+ —)	Negative
9.	Miss K.	?? yrs.	Harlem Disp.	Had tub. salpingitis. rem. by Dr. Tovey 1 yr. ago. Lately began to complain of backache. Probably tuberculosis of lower lumbar. 6 mos. duration.	Negative	Specimen not obtained
10.	Mrs. R.	29 yrs.	Private	Cured pulmonary. At beginning Von Pirquet positive. Loss of weight, night sweats and elevation of temperature, no cough. Physical signs positive. 3 yrs. duration.	Negative	Negative
11.	A.A.	23 yrs.	Dr. Bonime at Polyclinic	Pulmonary tub. Treated by tuberculin. Cured. T.B. found in sputum at onset.	Negative	Specimen not obtained
12.	P. M.	23 yrs.	"	Tuberculosis of left hip. Cured by tuberclin and cast. 18 mos. duration.	Negative	Negative
13.	F. G.	30 yrs.	Polyclinic	Tuberculosis of right 4th and 5th metacarpal, also mid-dorsal. Cured. Duration ?	Negative	Negative
14.	M. S.	28 yrs.	Dr. Bonime at Polyclinic	T.B. of both kidneys. A stone in left ureter. T.B. arrested. Got 60 injections of tuberculin. 3 yrs. duration.	Negative	Negative

CONTROL CASES T. C. F. TESTS, ETC.

	NAME	AGE	SOURCE	DIAGNOSIS	T.C.F.	T.B. IN FECES
1.	B. B.	35 yrs.	Roosevelt	Pains in lower extremities, due to toxemia. Chr. endometritis.	Negative	Negative
2.	M. D.	46 yrs.	Roosevelt	Osteoarthritis of spine and arthritis of wrist, following a pneumococcus pericarditis suppurative and sinus following operation.	Negative	Specimen not obtained
3.	Mrs. G.	67 yrs.	Roosevelt	Chronic rheumatism.	Negative	Specimen not obtained
4.	Mrs. L.	26 yrs.	Polyclinic	Double weak feet	Negative	Specimen not obtained
5.	P. S.	38 yrs.	Roosevelt	Painful stiff flat feet.	Negative	Specimen not obtained
6.	A. G.	68 yrs.	Roosevelt	Osteoarthritis of left knee.	Negative	Absent
7.	Mrs. P.	53 yrs.	Roosevelt	Osteoarthritis of right knee.	Negative	Negative
8.	R. B.	?? yrs.	Dr. Radda's case	Gonorrheal infection.	Negative	Specimen not obtained
9.	R. D.	?? yrs.	Dr. Moravek	Normal subject.	Negative	Specimen not obtained
10.	Dr. M.	30 yrs.	Dr. Moravek	Normal subject.	Negative	Specimen not obtained
11.	A. S.	?? yrs.	Dr. Moravek	Normal.	Negative	Specimen not obtained
12.	T.	30 yrs.	Dr. Radda's case	Gonorrheal infection	Negative	Specimen not obtained
13.	G. R.	32 yrs.	Roosevelt	Syphilitic adenitis of axilla. Treated for T.B. for 1 yr.	Negative	Negative

DUBIOUS CASES.

	NAME	AGE	SOURCE	DIAGNOSIS	T.C.F.	T.B. IN FECES
1.	J. D.	18 yrs.	Polyclinic Dr. Wallace	Tuberculosis of right tarsus? 6 mos. duration.	Negative	Negative
2.	C. B.	30 yrs.	Polyclinic Dr. Bonime	Tuberculosis of left tibia? 3 yrs. duration.	Negative	Negative
3.	N. W.	32 yrs.	Polyclinic Drs. J. A. Wyeth and Bonime	Cervical and axillary adenitis tuberc.? 6 yrs. duration.	Negative	Negative
4.	M. B.	24 yrs.	Private in Polyclinic	Gonorrheal arthritis of left hip. Probably T.B. 1½ yrs. duration.	Negative	Negative
5.	Wm. H.	25 yrs.	Polyclinic Dr. Morgan's case	Cervical adenitis tuberc.? 9 mos. duration.	+ — Bovine — Human	Specimen not obtained
6.	Mr. N.	28 yrs.	Roosevelt—Dr. Dowd's case	Tuberculosis of right hip. Duration ?	Negative	Specimen not obtained

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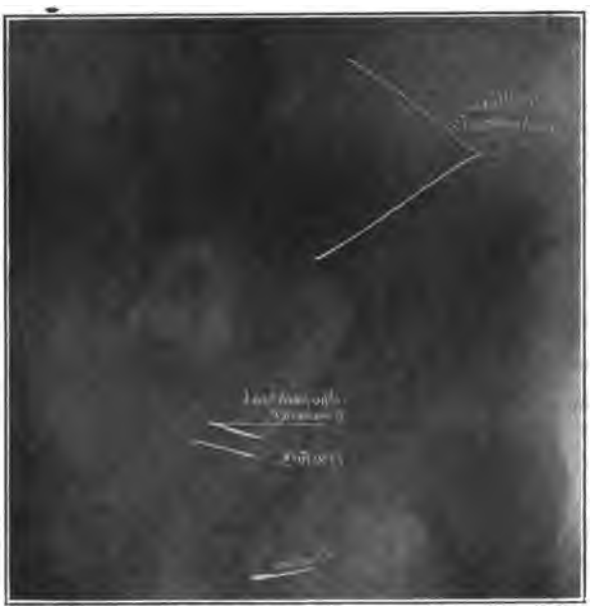
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ASSOCIATION OF SURGEONS OF THE PENNSYLVANIA LINES.
ASSOCIATION OF SURGEONS OF THE SEABOARD AIR LINE RAILWAY.

THE SACRO-ILIAC ARTICULATION.*

By L. S. OPPENHEIMER, M.D., Tampa, Fla.

Next to our friend, the enemy, our much maligned liver, there is probably no other portion of the human anatomy whose ailments tax the etiological ingenuity of the doctor more than the back.

This obscurity and the shrewd application of unique methods of massage and judicious manipulation made possible the coming into life of the



chiropractic, the profitable encouragement of the osteopath, and a literature on the subject in their enterprising fields of faddism as conspicuous for its voluminousness as it is by its paucity in our own; and both for similar reasons—its very obscurity.

Some of you will remember a few years ago in the President's Address before this Association I suggested that all our colleges should devote a certain brief time annually to the exposition or expounding of the more popular medical fads or quasi cults of the day.[12]

We are often confronted in practice and in the courts by some of these *doctors*. And it is by no means a cock-sure matter-of-course that the very intelligent jury will accept your calm, unbiased, scientific testimony against the intense dicta of the *other* doctor who flourishes learnedly a skeleton before its very eyes.

The following is a typical example:

In 1911, an elderly lady and her young widowed daughter were thrown rather violently from their seats in a S. A. L. R'y. collision. The former received some injuries for which she sued the company and got a $4,000 verdict. This financial therapeusis, as usual in many of these cases, entirely removed her disabilities within a month or two, when the pair went to California. There the daughter concluded to try her luck by the same route for a possible $10,000. She had two osteopaths "of prominence" examine her. These testified that "she had a subluxation of the ilium, twisting of the spine and pelvis, deformity, shortening of the leg, lameness, pain, etc." A local osteopath corroborated the possible existence of all of these, and produced a skeleton for demonstration. The plaintiff did not leave California. Several reputable surgeons of this city were put on the stand who refuted the correctness of all of these statements. The jury, in giving her $1,000 "out of sympathy" as some of them confessed, virtually acknowledged that they believed the California and Tampa osteopaths in preference to the regular Tampa surgeons.

It is not intended to discuss here the various classes of backache, but merely the surgical aspects, both static and traumatic, of some sacro-iliac lesions and pains.

Representative surgeons take diametrically opposite grounds on this question, and demonstrate the necessity for a more intimate knowledge of the kinetics involved and for greater pains in interpreting radiographs.

To somehow understand or appreciate the tremendous power that is demanded of the structures of the lumbo-sacro-sciatic structures you will pardon a cursory review of the important ligaments of the joint itself.

The body is held erect by muscles and ligaments, the bulk of the weight being forward, or in front of the vertebral line. It is well known the dead body placed erect without support falls forward. Hence the upright position is dependent upon and maintained by the larger, longer and more numerous posterior muscles and ligaments. The largest and strongest of these, indeed the strongest in the whole body, are the sacro-iliac and sacro-sciatic. These are the anterior and posterior, superior and inferior sacro-iliacs and the interosseous. According to Morris[5] the latter is the strongest of them

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* Read before meeting of Association of Seaboard Air Line Railway Surgeons, October 19, 20 and 21, 1914.

all, and consists of fibers of different lengths passing in various directions between the two bones. The sacro-iliac cartilage[6] or plate is really one mass, usually with a very thin synovial cavity.

The sacrum is situated like a key-stone in the pelvic arch and supports not only the superimposed body, but also, in addition, every weight that is lifted from the ground, whether it be one pound or one thousand pounds.

Nevertheless the sacrum is in no sense a key-stone,[7] inasmuch as the inferior diameter is greater than the superior.

This strain is exerted entirely on the above named ligaments which run in various directions like guy ropes, to anchor the sacrum firmly to the ilia and ischia.

These ligaments may be sprained, stretched or strained; but a true relaxation of the joint itself sufficient to be perceptible, except as stated later on, has not yet been found to be admissible of proof.[1,8]

Difficult labors, standing too long or in a relaxed attitude, stooping, lifting, sitting in uncomfortable positions, etc., may be causative factors. But it would be difficult to understand the law in physics which would permit a rotation or luxation here without a corresponding displacement at the pubis or fracture of the pelvis. It is well known among obstetricians[7] that in many labor cases, when the woman is placed on the edge of the table, her legs hanging down without any support, that the diagonal conjugate may be increased nearly one centimeter. Notwithstanding this fact, it is not possible to make out any dislocation or rotation at the joints.

Lovett,[1] who has studied this question carefully in 83 cases of backache, concludes that "sacro-iliac relaxation" could not be proven in his own cases; nor was it made plain in any of the 84 cases of Meisenbach, in which the latter states that it clearly existed.[2] No writer has ever produced a radiograph that showed this condition unmistakably or incontestably. Evidence on the subject needs further confirmation.

Chapman[6] presents a well written argument on "dislocations, rotations and relaxations," in which his conception of the ease with which these occur is strikingly in contrast with the writer's observations. He says: "Certain strains, lifting, or slight accidents, may be sufficient to produce severe lesions in the sacro-iliac joint, traumatising ligaments and sometimes causing one or both articulations to slip." He mentions, as an example, "a chauffeur who felt a sudden pain in his back while cranking his machine. Later a radiograph showed an abnormal sacro-iliac joint with a slight subluxation. Under ether manipulation a distinct click was heard, representing a reduction." But the doctor fails to produce the radiograph for us to interpret. His data are insufficient, hence futile; his proof not convincing.

The trend of teachings and practice of osteopathy seems clearly, though briefly, exemplified in the following extracts from some of their prominent writers:

"I have been astonished to find what a large number of people are afflicted with rotated innominates. The results of this affection are very serious indeed, but the reduction can be made in a few seconds and the effect is *presto-change*. Once in a while we must resort to adhesive plaster. The lengthening or shortening of the leg is a very significant diagnostic point.[10]



The commercial value of this joint to the osteopath and the chiropractic is thus naively expressed by another writer: "The sacro-iliac articulation is one of the most important joints in the human anatomy to the *osteopathic* physician."[10]

A prominent Canadian osteopath[11] publishes a

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very elaborate series of pictures of pelves nicely colored, with geometric tracings, purporting to demonstrate subluxations, rotations, etc. Every one of these is wholly schematic, drawn by the gifted author himself.

In Tasker's text-book on osteopathy[3] the methods of investigation and demonstration are plainly shown by pictures of the pelvis which prove the existence of distinct lesions of the sacro-iliac joint to the osteopath and the chiropath, but not to the unbiased; the slightest variations from the normal, esthetical, symmetrical being used by the former as evidence of pathological importance.

On the other hand, Stimson[4] says that in fractures of the pelvis, if the fracturing force is prolonged, there frequently occurs rupture of the ligaments of one or both synchondroses with gaping of the joint. But not a dislocation.

At the Hudson Street Hospital and Dispensary, where the writer frequently goes to study the rich fracture material and where an annual average of 1,500 fractures have been treated for many years, Stimson has seen only one case of dislocation of the sacro-iliac joint, although he reports numbers of fractures of the ilia and sacra.

The following cases are presented to illustrate the facility with which an error in diagnosis in supposedly luxated pelves may be made by surgeons, individually and collectively:

Wm. B., aged 24, telephone lineman, was wiring on top of a pole, 34 feet from the ground, when the pole, which had not been sunk deep enough in the ground, fell, pinning him underneath, with the pole diagonally across his right pelvis. He complained of great pain in the right sacro-iliac joint, slight pain in the right inguinal region, inability to raise the right leg, turn over, or sit up. The right posterior superior spine of the ilium was apparently swollen and displaced backwards and upwards. Anteriorly there was nothing of importance except tenderness on pressure. Not feeling certain of my diagnosis I had several colleagues, including my assistant, Dr. Beyer, and Dr. John D. McRae, Roentgenologist to the Hospital Staff, examine him. Diagnosis: Dislocation of the sacro-iliac joint. Treatment: Recumbent position with strapping of the hips. After three weeks he was allowed to go around on crutches, keeping his foot off the ground. A radiograph taken by me was negative. A plaster of Paris cast, with spica holding the leg at about 15 degrees, was put around the pelvis. The sacro-iliac pain still persisted. I had Dr. McRae make a number of stereographs and radiographs, about ten in all, at various angles. Every picture showed clearly two fractures, one of the pubic portion of the pelvic brim, through the horizontal ramus in front of the pectineal line—the usual site of most pelvic fractures—the other through the descending ramus near its junction with the pelvis. Three of these plates are herewith exhibited. The deformity, or inward bending of the pelvic ring, and the callus formation at the descending ramus are well shown in each of them. The sacro-iliac articulation is normal.

Now there are several lessons to be deduced from this case, not the least of which is that not all of us are roentgenologists merely because we can make skiagraphs. Pain is not necessarily greatest at the seat of fracture. There need be no gross deformity or displacement. Both subjective and objective symptoms may mislead.

It is now three months since the accident, yet the pains are still confined to the sacro-iliac articulation when he attempts to walk without crutches.†

In 1905, L. J., an S. A. L. brakeman, while coupling cars, was caught between the bumpers at the pelvic level. His greatest pain was in the lower abdomen and the sacro-iliac region. He was catheterized and the urine found to be charged with blood, which continued for several days. The catheter was allowed to remain in the bladder for four days to avoid urinary infiltration. Pressure over the ramus of the pubis elicited pain for some weeks. The pain over the sacrum and its joint continued for many months. I was unable to locate the points of fracture. No apparatus was used to treat the pelvic fracture. Usually these cases die from shock, hemorrhage or urinary infiltration. This fellow, however, in a dirty hovel, with a long siege of complications, recovered. This case happened before the days of the roentgenologist.

These varied views do not, however, affect the principles of treatment. Rest by the various methods is the logical procedure.

The well-known fact that fractures and strains of the pelvis, like those of the ribs, recover just about the same, whether treated or not, is sufficient

† Six months after the injury this man was able to walk without pain or limp.

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evidence to disprove the idea that the parts must be immobilized.

It is not reasonable to suppose that the sacro-iliac joint, which resists such heavy downward thrusts of the superimposed structures, plus additional foreign weights, could be immobilized by adhesive strips applied to the elastic skin, or belts around the cushions of fat and muscles surrounding the pelvis.

Adhesive bands, 2 to 3½ inches wide, encircling the pelvis, or with the ends terminating just beyond the anterior iliac spines, reaching from the lower margin of the pubis to the iliac crests, or higher; plaster-of-Paris pelvic jackets with or without spica; stiff canvas, properly fitting supporters, or corsets, laced, with flat fronts and perineal straps; rest in bed with comfortable cushions under the back; the recumbent position in chairs; massage with or without embrocations; moist heat; later on, gentle exercise; the use of crutches as soon as practicable, and not abandoned too early; the recumbent posture, often each day; high heels to help selected static cases by changing the center of gravity—these seem to yield the best results.

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THE VALUE OF X-RAY DIAGNOSIS IN FRACTURE CASES.*

By FRANK L. ESKRIDGE, M.D., Atlanta, Ga.

The cases of injury that demand the greatest care, skill and exactness upon the part of the railroad surgeon are certainly fractures. They constitute about one-fifth of all railroad injuries, and if not properly managed, serious consequences not only to the patient but also to the surgeon in charge, as well as the claim department of the road, may result.

In many instances the difficulty in making exact diagnoses is, indeed, great owing to the location of the fracture, the extent of the injury, and the conditions under which the case is handled, and yet it is essential that the character of the fracture should be definitely ascertained at the earliest possible moment in order that proper adjustment may be made before too much time is lost.

In the medico-legal type of fractures, as are all those coming within the work of the corporation surgeon, an exact knowledge of the extent, location and nature of the fracture is very important, and upon it depends the competency of his opinion as to the probable result. An indefinite and incomplete report by the surgeon as to the existing condition is of little or no value to the claim adjuster, and grants a wide margin to the malingerer or possibly works a grave injustice to the patient.

An erroneous diagnosis, or the failure to immediately adjust before too great time has elapsed after the injury, may indeed disastrously affect the surgeon's reputation in view of the resulting deformity that could have been corrected. The importance and responsibility of fracture work is so strongly recognized by the profession generally that some of our most prominent surgeons refuse to handle this class of injuries at all. With this responsibility in mind it certainly behooves the railroad surgeon to avail himself of every detail that would protect himself and his corporation, as well as to render the best service to his patient. To this end the x-ray plays a most important part. While, of course, x-ray plate interpretation may be a matter for the radiologist to decide and is fraught with the risk of erroneous readings and the adoption of useless or vicious lines of treatment, if attempted by one unskilled or unfamiliar with normal x-ray anatomy, the diagnosis of fracture is usually easy and fully within the scope of the general surgeon. It is well to remember at this point that x-ray anatomy differs materially from actual anatomy in that in one we are studying shadows and in the other real structures. Shadows through bodies are very deceptive, and thus it is important that we familiarize ourselves with normal skiagraphic appearances at various angles before undertaking x-ray interpretation in major cases.

In some cases it is extremely hard even for the expert to accurately determine from an x-ray plate

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* Read before the thirteenth annual session of the Association of Seaboard Air Line Railway Surgeons, October 19, 20, 21, 1914.

how greatly out of position a solution of the continuity of a bone may be, with even a marked skiagraphic print, while with an ordinary print subperiosteal cracks or even deeper fractures in which the outline of the bone shows no irregularity are detected of which otherwise the surgeon would be in ignorance. This latter condition, we might assume, would be of no material difference to the welfare of the patient, but would be of great service to the surgeon in litigation cases. So greatly do I appreciate the value of x-ray diagnosis in these cases that in my practice, particularly in the corporation cases that I handle, I make a routine practice of skiagraphing every questionable case, if for record alone. In numerous instances grave errors have been detected and remedied in time, malingerers have been caught, while fraudulent cases have been exploded. For chest, abdominal and hip injuries the larger machine is necessary, but for extremity cases the small portable machine will suffice. Foot injuries are perhaps the most deceptive of minor injuries. Cracked, linear, or split fractures of the tarsal or metatarsal bones of little surgical importance loom into greatness when some shrewd lawyer has an x-ray made. Should your report refer only to a contusion and though the case makes a perfect recovery, you are placed in a very awkward position with both the plaintiff and defendant in litigation.

Several years ago I was called by a physician to reduce the fractured femur of a boy of fourteen caused by a football accident. At his home under very good conditions we anesthetized, reduced the fracture and placed the limb in a plaster-of-Paris cast. To all outward appearances and measurements the fracture was properly adjusted. The following day I made a skiagraph and found an overlapping of several inches. The cast was cut down, the bone properly coapted, as shown by another plate, and replastered with perfect results.

Another case in mind is that of a beautiful young lady whose femur was fractured in a runaway accident and was reduced by a physician who did not avail himself of the x-ray to verify whether the fracture had been properly reduced. Three months later she reported with the condition shown in Plate 1, which I will pass around. She has three inches shortening and walks with a considerable limp. This could have been easily avoided if the fracture had been reduced properly.

Plate 2 shows a fracture of the second metatarsal bone which was impossible to diagnose without the skiagraph. This picture was taken purely for diagnostic purposes.

Plate 3 shows on the right hand an impacted fracture of the proximal end of the first metacarpal bone. The left hand is normal.

Plate 4 shows a reduced fracture of the femur which was set previously in a Hodgen's anterior splint. Uneventful recovery with perfect results occurred.

Plate 5 shows a fractured femur reduced and held in place with Lane plates. At this point I might say that I do not recommend this method, but use silver wire instead, as the plates usually have to be removed.

Plate 6 shows syphilitic destruction of bone on the inner side of the carpal bones of the right hand, the left being normal.

Within my experience with almost all forms of fractures I feel that x-ray diagnosis is absolutely essential in every instance, and should be employed as a matter of routine by the railroad surgeon.

OPHTHALMIA.*

By G. A. NEUFFER, M.D., Abbeville, S. C.

It is not the purpose of this paper to discuss simple or catarrhal ophthalmia, or what is commonly known as epidemic sore eyes, but I wish to call your attention to the purulent forms of the disease.

This I believe to be a subject of much greater importance to the general practitioner than is usually appreciated by him. For instance, 30 per cent. of the blindness in the United States is caused by ophthalmia neonatorum, and the responsibility for this rests entirely with the physician in attendance at the child's birth.

Then again all the varieties of purulent ophthalmia among adults are of such violence and progress with such rapidity that in the great majority of cases it is impossible to get the patient to an eye specialist until the damage is irremediable, and there is nothing left for the specialist to do but to pronounce that sight is lost and to say that the patient should have come sooner.

This condition therefore is one which the general practician must take care of, must treat

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promptly and intelligently or the patient will go blind.

I shall endeavor to review briefly some of the varieties of ophthalmia and present some suggestions along the lines of prevention and cure.

All cases of purulent ophthalmia are due to infection. Some authorities claim that it is *always* of gonorrheal origin, but this I strongly doubt, as I believe there are other infections which produce the same condition. And whether gonococci are found under the microscope or not, the local changes are the same; the treatment is the same; and lack of proper treatment will produce the same result, and that is blindness.

The symptoms may be briefly described as follows: There is excessive swelling of one or both eyelids; the whole eyeball and lids are inflamed; there is a copious discharge, which is at first clear and watery and then contains shreds of mucus, but becomes more purulent within twenty-four to forty-eight hours, until it presents a typical appearance, a creamy, slightly greenish pus. This pus is exceedingly infectious, and when only one eye is affected, the well one should be properly protected.

Ophthalmia neonatorum I put at the head of the list, because it can be easily prevented, and when it does occur, it is almost invariably due to neglect on the part of the accoucheur.

For purposes of prevention, the eyes of every child should be immediately cleansed after birth, and two or three drops of a 2 per cent. solution of nitrate of silver dropped into each eye. Then the nurse should be instructed to bathe the eyes every morning with a warm solution of boric acid.

So necessary do I believe this treatment of the eyes of the newborn to be that I am in favor of a law being enacted in every state requiring every physician doing obstetric work to carry this silver solution in his obstetric bag, and to use it. In fact I believe there are one or two states which now have such laws.

If in spite of the above prophylaxis ophthalmia develops, or should you be called in to manage a case, there is only one plan of treatment worth while—it is one that I have used for years and with good success.

The nurse should be instructed to place one ounce of boric acid in a quart of warm water, to keep this solution warm, and to use it for washing out the child's eyes just as often as any pus collects, even if this be necessary a hundred times a day. Then the physician himself should make an application to the eyes of a sixty grain to the ounce solution of nitrate of silver, immediately neutralizing this with copious applications of a solution of common salt. This treatment should only be employed once in twenty-four hours; one application or at most two nearly always suffice. One drop of a ten grains to the ounce solution of argyrol should be dropped into the eye three times a day, as long as there is any pus present, after which an astringent lotion may be used.

To reduce the swelling and inflammation, squares of lint, which have been kept on a block of ice, should be applied over the eyes, the cold applications being suspended for twenty minutes out of every hour so as to prevent the occurrence of ulcer or perforation of the cornea.

The varieties of ophthalmia seen in adults are those due to gonorrheal or diphtheritic infection, to exposure of the eyes to bright sunlight on the snow, this causing what is known as snow blindness, also to the effect of electric light. Another form is ophthalmia contagiosa, also known as military or Egyptian ophthalmia, and lastly we have sympathetic ophthalmia.

The treatment of ophthalmia in the adult is the same as that outlined for ophthalmia neonatorum, due allowance being made for the difference in age.

Ulcer of the cornea followed by perforation is more likely to occur in adult cases, and where there is any indication of corneal involvement atropin must be used.

REPORT OF A CASE OF BONE GRAFTING.*

By S. B. LITTLE, M.D., Colbert, Ga.

I wish to report to you one or two of my most interesting cases, one to which I have devoted about eighteen months of hard work and study, and have at last been able to see my efforts crowned with success.

About June 1, 1912, a young man, about twenty-one years of age, was brought to my office by his sister, who stated that he had been suffering for ten years with chronic sore leg. When ten years

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* Read before meeting of Association of Seaboard Air Line Railway Surgeons, October 19, 20 and 21, 1914.

of age, while cutting some sugar cane with an ordinary pocket knife, he let the knife slip and drove the small blade up to the handle into the front of his leg just below the patella. Being an orphan and his kin people very poor, nothing was done for the boy, and he soon had a chronic running sore at the place where he sustained the knife wound. In spite of constant pain in the leg he worked in the field all the time and never had had any treatment until his sister brought him to me. She stated that the limb had begun to pain him so badly at night just before his visit to me that he could not rest or sleep.

Upon examining the limb I found the wound discharging profusely a thick, dark looking and very offensive pus. There was some redness as well as a little swelling around the ulcer and I found more or less tenderness all along down the front of the tibia, and especially marked at certain points. I sent the boy to a hospital, and after having some x-ray pictures taken of the limb, I had him prepared for operation.

An incision was made from about two inches below the patella, along the anterior part of the tibia down to about the junction of the middle and lower third. After getting down to the periosteum it was found that he had not only a periostitis but an osteomyelitis. Ulceration had taken place, and the medulla of the bone had become so diseased that in scraping out the necrosed bone it was necessary to curette the medullary canal. All antiseptic precautions had been taken, and after the wound was well sponged with a weak bichloride solution we were ready for bone grafting. I had prepared a fresh piece of bone from a young calf, but luck favored me, and I obtained a piece of fresh tibia from a young negro who had been killed accidentally the night before. This was so shaped as to replace the parts of bone scraped away. We were very careful to remove the fresh medulla from the tibia obtained from the negro boy and insert it into the medullary canal of the patient. The bone graft was secured with several silver screws run down into the bone, and before closing the wound we made a small round opening through the transplanted bone for drainage. We started this opening at about the lower third of the new bone, and extended it upwards and inwards until it reached the old bone, guarding it carefully so that all discharges would come away promptly and at the same time keep me posted as to what was taking place on the inside. The wound was then closed with buried catgut sutures, and a dressing of borated gauze saturated with warm saline solution applied. I dressed the limb every third day myself and directed the boy's sister, who was his nurse, to keep fresh borated gauze saturated with normal salt solution applied to the wound. Every third day I washed out the drainage canal with mild antiseptic solutions and ran strips of iodoform gauze well up into this channel.

The boy got along without any trouble whatever and things went well up to the beginning of the third week, when his leg ached a little and he had a slight rise of temperature for about two days and his urine clouded up a little. I gave him broken doses of calomel followed by a saline and then administered a diuretic for a few days and put him back on liquid diet, and he went on to a good recovery. During the following year, 1913, this young man worked at a saw mill rolling off sawdust during the day time and going to country dances at night. A week or so ago he rode a bicycle three miles to my office in the night, and when I asked him how he was getting along he said fine, and that his negro bone was working overtime.

ASSOCIATION OF SEABOARD AIR LINE RAILWAY SURGEONS.

The following has been sent to the members of this Association by the Secretary:

Ailey, Ga., July 14, 1915.

My Dear Doctor:

Our coming meeting will be held at Wrightsville Beach, N. C., August 17th and 18th. The usual arrangements for Pullmans, schedules, entertainment and special features will be made in due time, and will appear in the program.

The object of this advance letter is to inform you of the approaching meeting and to ask that you prepare a paper for the occasion, the title of which should be sent me at once. Remember the valuable prizes offered for the four best papers read before the meeting. You are requested to begin arrangements to attend this meeting, accompanied by your family.

If you have not paid your dues, send me check for same at once. Please do not delay program by withholding the title of your paper, as it requires considerable time to arrange the final program.

Yours fraternally,

J. W. PALMER, M.D.,

Secretary and Treasurer.

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"ARTICLES OF FAITH" CONCERNING CANCER.*

A Platform Upon Which to Unite in the Campaign of Education.

1. That the hereditary and congenital acquirement of cancer are subjects which require much more study before any definite conclusions can be formed concerning them, and that, in the light of our present knowledge, they hold no special element of alarm.

2. That the contagiousness or infectiousness of cancer is far from proved, the evidence to support this theory being so incomplete and inconclusive that the public need have no concern regarding it.

3. That the communication of cancer from man to man is so rare, if it really occurs at all, that it may be practically disregarded.

4. That those members of the public in charge of or in contact with sufferers from cancer with external manifestations, or discharges of any kind, need at most take the same precautionary measures as would be adopted in the care of any ulcer or open septic wound.

5. That in the care of patients with cancer there is much less danger to the attendant from any possible acquirement of cancer than there is of septic infection or blood poisoning from pus organisms.

6. That in cancer, as in all other disease, attention to diet, exercise and proper hygienic surroundings is of distinct value.

7. That, notwithstanding the possibility of underlying general factors, cancer may, for all practical purposes, be at present regarded as local in its beginning.

8. That, when accessible, it may, in its incipiency, be removed so perfectly by radical operation that the chances are overwhelmingly in favor of its nonrecurrence.

9. That, when once it has advanced beyond the stage of cure, suffering in many cases may be palliated and life prolonged by surgical and other means.

10. That while other methods of treatment may, in some cases, offer hope for the cancer victim, the evidence is conclusive that surgery, for operable cases, affords the surest present means of cure.

11. That among the many advances in and additions to cancer treatment, the improvements in and extensions of surgical procedure surpass those in any other line, and fully maintain the pre-eminent position of surgical palliation and cure.

12. That there is strong reason to believe that the individual risk of cancer can be diminished by the eradication, where such exist, of certain conditions which have come to be regarded as predisposing factors in its production.

13. That some occupations, notably working in pitch, tar, paraffin, anilin or soot, and with x-rays, if not safeguarded, are conducive to the production of cancer, presumably on account of the chronic irritation or inflammation caused.

14. That prominent among these predisposing factors, for which one should be on guard, are: general lowered nutrition; chronic irritation and inflammation; repeated acute trauma; cicatricial tissue, such as lupus and other scars, and burns; benign tumors—warts, moles, nevi (birth-marks), etc.; also that changes occurring in the character of such tumors and tissues, as well as the occurrence of any abnormal discharge from any part of body, especially if blood-stained, are to be regarded as suspicious.

15. That while there is some evidence that cancer is increasing, such evidence does not justify and present alarm.

16. That suggestions which are put forward from time to time regarding eugenic, dietetic and other means of limiting cancer, should not be accepted by the public until definitely endorsed by the consensus of expert opinion. Such consensus does not exist to-day.

17. That so far as we know there is nothing in the origin of cancer that calls for a feeling of shame or the necessity of concealment.

18. That it will be promotive of good results if members of the public who are anxious about their health and those who wish to preserve it will, on the one hand, avoid assuming themselves to be sufferers from one or another dreadful disease, but, on the other hand, will submit themselves periodically to the family physician for a general overhauling.

19. That at all times and under all conditions there is much to be hoped for and nothing to be feared from living a normal and moderate life.

20. That the finding of any abnormal condition about the body should be taken as an indication for competent professional and not personal attention.

21. That watchwords for the public until "the day dawns" and the cancer problem is solved, are: Alertness without apprehension, hope without neglect, early and efficient examination where there is doubt, early and efficient treatment when the doubt has been determined.

* During the four-day Cancer Educational Campaign, held under the auspices of the Vermont State Medical Society, June 8-11, 1915, Dr. William Seaman Bainbridge, of New York City, presented the accompanying twenty-one "Articles of Faith" at several sessions. They form the conclusion of a paper entitled "THE CANCER PATIENT'S DILEMMA. A Plea for the Standardization of What the Public Should be Taught in the Campaign of Education Concerning Cancer," which Dr. Bainbridge read at one of the sessions, and which appears in full in the Cancer Number of the *New York Medical Journal*, July 3, 1915.

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Surgical Gleanings

When Shall a Portion of a Tumor be Excised for Diagnosis.—The following, which appeared in the *Weekly Bulletin of the Department of Health,* City of New York, March 13, 1915, is most timely: "Some time ago the suggestion was made that this Department call attention to the dangers to be apprehended from a biopsy in cases of suspected cancer. Our correspondent pointed out that 'it is no indifferent matter to cut into a cancerous area; it is well recognized that this procedure may heighten the malignancy of the growth, often converting a relatively benign lesion into a very rapidly growing one; and that it favors metastases. This is especially true in those cases where, either through the lack of asepsis on the part of the physician or because of the unclean surface of the lesion, a secondary inflammation follows the biopsy.' * * * 'If a biopsy is necessary (and it frequently is necessary), the section should be made in such circumstances that the radical operation may follow either at once or within a few days. The patient's welfare is best served if the suspected cases are sent to the surgeon at once; and the surgeon should defer the making of the probatory section until the patient has been admitted to the hospital, so that there need not be any delay between the establishing of the diagnosis and the operation.' Before issuing the warning suggested by our correspondent, the matter was referred to the American Society for the Control of Cancer. After consideration by the Executive Council of that society, a special committee was appointed to prepare a statement to cover the questions raised. In transmitting this to the Department the committee asks us to point out that it is hardly possible adequately to cover this important subject in so brief a statement. The committee, however, believes that, broadly speaking, the advice here given will serve as a general guide. 'There are two important questions concerned when it is proposed to remove a portion of a suspected malignant tumor for diagnosis: one, the advantage gained by microscopical examination, which usually furnishes a positive diagnosis of the nature of the disease, and second, the danger of aggravating the disease by trauma. 1. It is universally agreed by surgeons and pathologists that in a large group of cases the former advantage decisively outweighs the latter danger. It is, therefore, a universal practice to support the clinical by a microscopical diagnosis in cases of reasonable doubt. In the opinion of some of the best authorities, this practice has justified itself. In fact, since the gross diagnosis of malignancy in tumors is difficult and sometimes impossible, it seems proper to facilitate as far as possible the means of securing accurate microscopical diagnosis. The necessity of making such diagnosis will be determined by the skill of the clinician. Some are more experienced in the field than others. In general, the biopsy becomes desirable when the clinician, whoever and wherever he may be, is in doubt, and a decision urgent. Some capable authorities would go much further, and maintain that it is of importance to the patient that the exact type of the tumor should be determined before the operation. 2. Against these considerations stands the danger of aggravating the disease by trauma. The extent of this danger will depend on the nature and the position of the tumor and must be judged in each instance from all the factors in the case. To cut through the skin into a malignant tumor of the breast and remove a piece for examination is generally discountenanced. The whole tumor should be removed, or the whole breast, and the whole mass subjected to examination. Not a few errors in diagnosis result from the excision of inflamed tissue on the edge of a tumor, the malignant area being missed. These errors occur in the breast, prostate, and with comparatively inaccessible growths in various regions. Unless a tumor can be accurately located, it is better not to cut into it for diagnosis. In general, it may be said that incisions into actively growing, deep-seated, malignant tumors should, if possible, be avoided. Such a trauma may disseminate tumor cells through the vessels, or permit unnecessary extension to the skin or surrounding tissues, or accelerate growth by relief of capsular tension. On the other hand, there is little danger from the excision by a clean cut of a sharp knife of a suitable portion of any superficial growth of skin or mucous membrane. Under all circumstances, it is highly important to avoid rough handling, kneading or crushing the tissues. The wisdom of a biopsy may often depend on the possibility of obtaining a reliable opinion from the microscopist, in the absence of which it is better to rely on clinical judgment.'"

Cancer of the Mouth.—Dr. Robert Abbe (*N. Y. Med. Jour.,* July 3, 1915), in a study of the histories of the last one hundred cases of mouth cancer seen in his private practice, comprising 90 men and ten women, found that all the men were heavy smokers except one, while several of the women had also used tobacco. From his experience he considers tobacco as an especially prolific cause of all forms of cancer of the mouth owing to the incessant irritation to which it gives rise. "If one must use tobacco at all, a moderate and not abusive amount may not be injurious; but it stands proved that in any form it may be disastrous."

Transition of Gastric Ulcer into Carcinoma.—Dr. J. C. Hemmeter (*Med. Record,* July 3, 1915), from a study of the literature and his own large experience, expresses the opinion that whilst ulcer of the stomach may be a possible cause of cancer, it is a rare cause. According to Billeter's observations in 116 cases operated on for ulcer by simple gastroenterostomy only one reacted with a secondary carcinoma. In Hemmeter's experience only three cases of cancer developed in the later history of 232 cases of gastric ulcer observed during twenty-five years.

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Original Articles

TREATMENT OF LARGE OVARIAN CYSTOMATA.

By AP MORGAN VANCE, M.D., Louisville, Ky.

"The treatment required for ovarian cysts is, in all cases where possible, their extirpation by surgical means: palliative tapping is to be resorted to only when symptoms of extreme pressure require immedate relief."

In former years it was not an uncommon occurrence for operative intervention to be postponed until ovarian cystomata had attained gigantic proportions, and in many instances paracentesis had been practiced for months or even years prior to the invocation of surgery. Celiotomy with removal of the tumor was considered by the patient only as a *dernier ressort,* and unfortunately vitality had then become markedly reduced, and prolonged pressure upon important adjacent viscera had created such a degree of disturbance in anatomical relationship, that extirpation of the pathology was fraught with considerable difficulty and the result was oftentimes most disastrous. However, the patient was not invariably responsible for the delay in applying for surgical relief, as many of the older practitioners of medicine advised against operative treatment and recommended repeated paracentesis as the most appropriate procedure, this method of treatment being continued until the patient finally perished from exhaustion.

In pre-anesthetic and pre-aseptic times such an attitude upon the part of medical practitioners is not difficult of understanding, many of the modern essentials to satisfactory and successful operative surgery being then among the submerged or practically unknown quantities. As comparatively safe methods for the induction of general anesthesia now exist and the perfection of modern aseptic operative technic has rendered the mortality from celiotomy for ovarian cystomata practically *nil,* no reasonable excuse can be offered for suggesting or practicing paracentesis regardless of the size attained by the tumor, unless prompt relief from pressure becomes imperative to conserve life until operative intervention may be undertaken with safety. After the abdomen has been incised, however, withdrawal of the accumulated fluid is advisable, extirpation of the sac thus being facilitated and the necessity of making a large incision obviated. Intra-abdominal neoplasms which have existed sufficiently long to attain large size are usually extensively adherent to the adjacent viscera, yet their operative removal may sometimes be satisfactorily accomplished under a local anesthetic, although this is seldom practicable and the attempt unjustifiable unless there are valid contra-indications to general anesthesia. However, such operations have been successfully executed under local anesthesia, in at least one of which the neoplasm weighed nearly one hundred pounds!

During the last few decades, under early surgical treatment, the morbidity and mortality incident to the removal of ovarian tumors have been so minimized as to now represent almost a negligible quantity. Moreover, patients have become educated to apply for surgical treatment when the first symptoms of pelvic disease become apparent; consequently intra-abdominal tumors are extirpated before attaining gigantic size and before vitality has been seriously reduced. Therefore ovarian cystomata of any considerable magnitude are now considered as pathological curiosities.

When ovarian cystomata have attained enormous proportions, especially after paracentesis has been practiced over long periods, the vitality of the patient becomes alarmingly reduced from pressure, visceral distortion, and the constant drain to which the system has been subjected, anemia with marked emaciation being the logical results. This is a rule to which there are but few exceptions, and in such cases the patient is usually an unfavorable or per-

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haps an impossible operative risk when first observed by the surgeon. In many instances death ensues within two or three years after the beginning of paracentesis, in others the patient may exist in a state of chronic invalidism for an extended period of time. In the personal observation herein recorded, the patient did not succumb from emaciation and exhaustion until forty-six years after the first tapping, during the latter twenty years of which she was practically a helpless invalid.

Contrary to the belief which quite generally prevails, large ovarian cystomata are by no means confined strictly to elderly women. Several cases have been recorded under the age of twenty, the youngest patient being a girl of fifteen, the tumor (111 pounds) exceeding the body weight over forty pounds. In the majority of instances, however, development of the tumor does not begin until the patient has reached the age of thirty to thirty-five years.

As already intimated, large ovarian cysts are now encountered much less frequently than heretofore, operative removal being usually sought before they have attained huge proportions. Occasionally, however, operative intervention is delayed, either upon the advice of the attending physician or because of objections interposed by the patient, until vitality is reduced to such a point that surgery is inadvisable and the only permissible procedure is repeated paracentesis.*

In the operative treatment of large ovarian cystomata, the principal dangers are: (a) From the size of the tumor and consequent visceral disturbance from pressure and distortion; (b) from structural damage during the separation of extensive visceral and parietal adhesions which almost invariably occur; and (c) from resulting hemorrhage and shock. These dangers are correspondingly increased by the age of the patient, the degree of visceral disturbance, and the extent to which vitality has become impaired. Aspiration of the cyst should always be practiced after the abdomen has been incised and before attempted removal of the sac. As stated at the outset, surgical extirpation is to be advised, regardless of the magnitude of the tumor, wherever the condition of the patient will permit.

* It is a rather strange and incongruous commentary upon the reputed advance in modern achievement that practitioners of medicine may still be found who recommend repeated paracentesis in the treatment of ovarian cystomata. In certain instances the patient may persistently refuse operation and paracentesis becomes necessary as a conservative measure; but the attending physician is oftentimes responsible for the delay and ultimate unfavorable outcome.

In amplification of the foregoing remarks, a brief history of the following rather remarkable example coming under my personal observation is reproduced from memory. A full report was written shortly after the death of the patient, but the original notes cannot now be located.

Several years ago there was brought to me from a small interior town in Kentucky a Mrs. M., then about seventy years of age. She was in a most serious condition at the time, and was accompanied by two physicians. The patient was about the average size, and her original weight was probably 135 pounds. According to the history obtained she was married at the age of sixteen, and shortly thereafter the abdomen began to enlarge, which was at first presumed to be due to pregnancy. When it later became apparent that the enlargement was due to some cause other than pregnancy, the correct diagnosis was made. The tumor was permitted to remain undisturbed until the patient was thirty-four years of age, when it was first tapped. From that time until she came under my observation, about thirty-five years later, paracentesis was practiced more than one hundred and sixty times!

When the patient reached Louisville her abdomen was enormously distended, she was anemic and markedly emaciated, and a successful radical operation for removal of the tumor seemed absolutely out of the question. Her condition was such that she could not return to her home, and remained in an institution in Louisville until death occurred from exhaustion at the age of about eighty years! While under my care she was tapped between twenty and thirty times, about twelve gallons of fluid being withdrawn upon each occasion. Figured on the basis of twelve gallons at each tapping, as paracentesis was practiced one hundred and eighty-four times, the enormous total appears of 2,208 gallons; and as the fluid was gelatinous and heavy, weighing about ten pounds to the gallon, the total weight of the fluid removed during the forty-six years amounted to over twenty-two thousand pounds!

The literature contains the records of numerous examples of enormous ovarian cystomata, but in none of them did the patient survive for so many years after the practice of paracentesis was inaugurated, and so far as can be ascertained there is no record of such a tremendous amount of fluid being withdrawn as in the case herein reported. In the

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example recorded by Hunter many years ago, the cyst was tapped at frequent intervals during twenty-eight years, 940 gallons of fluid being thus liberated. More recently (1904) an instance is cited in which 500 gallons of fluid were withdrawn by one hundred and thirty paracenteses during a period of seven years!

While several articles have been written upon the subject of "Enormous Ovarian Cystomata," no serious effort has been made to collect and tabulate all the reported cases. Zacharias (26 cases) and Bullitt (25 cases) have probably presented the most comprehensive reviews of any previous authors. The following list embraces the cases cited by Bullitt and many others abstracted from ancient and modern literature. In most of the instances the contents of the cyst weighed one hundred pounds or more, but a few smaller tumors have been included. Some of the data concerning the older records were obtained from the admirable work of Gould and Pyle on the "Anomalies and Curiosities in Medicine," the remainder have been abstracted and epitomized from current literature, an incomplete memorandum of which is appended hereto. It is not claimed that all the reported cases of monstrous ovarian cystomata are reviewed, as the records of many of them are at present inaccessible to the writer. Care has been exercised to prevent duplication, and where there seems any question in this particular proper notation will be found.

Ford mentions an ovarian cyst from which by repeated paracentesis 2,786 pounds of fluid were withdrawn. Martineau describes a case in which during twenty-five years eighty paracenteses liberated 6,630 pounds of fluid, 495 pounds being withdrawn in one year.

Tozzetti refers to an ovarian cyst weighing 150 pounds. and Morand one from which within ten months 427 pounds of fluid were removed. Briddon removed an ovarian cyst weighing 152 pounds, death of the patient occurring within a few hours. (This is probably a duplicate of the case cited by Bullitt, q. v.) In Helmuth's case 559 pounds of fluid were withdrawn; the cyst was then removed by operation, and death of the patient promptly ensued.

McGillicuddy mentions an ovarian cyst containing 132 pounds of fluid. The patient was aged twenty-eight; the abdomen measured sixty-nine inches in circumference; distance from sternum to pubes forty-seven inches, the tumor reaching the knees.

Stone operated upon a girl of fifteen, removing an ovarian cyst weighing 81½ pounds. Ranney records the successful removal of a unilocular ovarian tumor weighing 95 pounds; Wall operated upon a patient for one of similar weight, death ensuing within a short time. Kelly describes an ovarian cyst weighing 116 pounds; Keith one of 89½ pounds; Gregory, 80 pounds; Bixby, 70 pounds; Alston, 70 pounds.

Cullingworth successfully removed from a girl of sixteen an ovarian cyst weighing about 90 pounds. Paracentesis had been practiced several times, and the patient was much emaciated. Circumference of the abdomen, 54½ inches. The tumor was adherent to the abdominal wall, the liver, spleen, and omentum. Before operation the patient weighed 170 pounds, a week thereafter, 79½ pounds. Recovery was uneventful.[1]

The following are brief excerpts of the collection of twenty-five cases published by Bullitt in 1900. In all his cases the sac and cyst contents weighed one hundred pounds or more. These abstracts are presented in chronological order as arranged by Bullitt in his original report.

(Gibb.) Ovarian tumor weighing 106 pounds removed post-mortem. There was great elongation of cervix uteri and vagina.

(Rodenstein.) Polycystic ovarian tumor weighing 146 pounds removed post-mortem. The mass was three feet high, covering the breasts and extending to the patient's knees.

(Neal.) Ovarian tumor removed post-mortem, contained fluid weighing 119 pounds. Patient had been tapped six times during three years prior to death; 487½ pounds of fluid thus removed.

(Goodell.) Ovarian cystoma weighing 112 pounds removed by celiotomy during life. There were extensive omental and parietal adhesions. The patient recovered.

(Kelly.) Ovarian cystoma weighing 116 pounds, successfully removed by celiotomy.

(Wells, cited by Kelly.) Ovarian tumor weighing 125 pounds removed by operation, the patient recovering.

(Keith, cited by Kelly.) Ovarian tumor weigh-

[1] From Gould and Pyle. Final result not shown in many of the cases.

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ing 120 pounds (statement by Emmet) with recovery of the patient.

(Kelly.) Ovarian tumor weighing 100 pounds successfully removed by operation.

(Buffet.) Eighty litres of fluid withdrawn to relieve impending asphyxiation. Death of patient occurred in forty-eight hours. Necropsy revealed unilocular left ovarian cystoma; also subperitoneal uterine fibroma weighing 36 pounds. The ovarian cyst contained ten litres of fluid, which added to the 80 litres removed during life makes a total of 180 pounds for the ovarian cyst, and 216 pounds as the combined weight of both tumors.

(Estes.) Polycystic thick-walled tumor in which intra-cystic papillary degeneration had begun. Tumor mass and fluid weighed 125 pounds. Operation difficult on account extensive adhesions, duration four and a quarter hours, 200 ligatures required in addition to free use of cautery. Uninterrupted recovery.

(Homans.) Ovarian cystoma, part of fluid aspirated a few days before operation, weighing 105 pounds. The patient recovered.

(Briddon.) Multilocular ovarian cystoma weighing 149 pounds, removed by operation. Patient died within eight hours. (This case may be a duplicate of one previously mentioned, v. s.)

(Cullingworth.) Aspiration day before operation. Fluid allowed to escape seven hours; 74 pints thick, grumous, chocolate-colored material containing much blood. Tumor adherent over entire anterior surface of abdominal wall. At end of half hour patient collapsed and died before abdominal incision was closed. Total weight of tumor and contents (including fluid removed day before operation), 154½ pounds.

(Cartledge.) Patient thirty years old. Abdominal enlargement first noted at sixteen. Circumference at umbilicus 66½ inches. Tumor removed by celiotomy weighed 111½ pounds. There were no adhesions. The patient recovered.

(Davis.) Multilocular ovarian cystoma weighing 160 pounds removed by celiotomy. Pedicle small, hardly requiring ligation. Practically no adhesions; hemorrhage inconsiderable. Patient partially collapsed during operation, but reacted and became conscious. Six hours thereafter sudden syncope and death.

(Keen.) Multilocular ovarian cystoma weighing 111 pounds removed from child of fifteen whose weight was 68 pounds! Moderate adhesions to omentum and abdominal wall, viscera entirely free. Uninterrupted recovery. "This case was especially remarkable, the age of the child being only fifteen years, and the weight of the tumor exceeding the child's weight by 43 pounds."

(Dayot.) Ovarian cystoma removed by celiotomy from girl of seventeen. About 15 litres fluid escaped when abdominal incision was made. Adhesions to abdominal wall and omentum, viscera free. Operation suspended three times on account of alarming syncope, completed in two and a half hours, patient placed in bed "in a semi-syncopal condition." Complete recovery. Total weight of cyst and fluid 198 pounds; body weight not quite 66 pounds.

(Maritan.) Ovarian cystoma removed by celiotomy. Numerous adhesions. Alarming collapse followed operation, but complete recovery ensued. Patient's weight before operation 254 1/10 pounds; tumor removed weighed 165 pounds.

(Harris.) Ovarian cystoma removed by celiotomy. Total weight of tumor and contents 182½ pounds. Patient diminutive Chinese woman aged twenty-five and weighing only 90 pounds. Prompt recovery.[2]

(Garcelon.) Tumor aspirated and 132 pounds of fluid withdrawn. Five days later sac with contents weighing 70 pounds removed by celiotomy. No adhesions. Total weight removed 202 pounds. The patient died two days after the operation.

(Keith.) Dermoid ovarian tumor containing 75 pounds of fluid withdrawn by paracentesis. Few days later celiotomy for removal of the tumor. Pelvic adhesions. Total weight of tumor and contents "more than 100 pounds." The patient recovered.

(Lynds.) Multilocular ovarian cystoma weighing 125 pounds removed by celiotomy. Cyst adherent to abdominal wall over entire surface, also to diaphragm, stomach and omentum. Prompt recovery.

(Gilliam.) Ovarian cystoma weighing over 176 pounds removed by celiotomy. Extensive adhesions to abdominal wall, separated with great difficulty. Patient made complete recovery.

[2] Why Bullitt and several others credit this case to Harris is difficult of understanding. The patient was operated upon by Dr. Elizabeth Reifsnyder, of Shanghai, China, in October, 1894. A full report of the case with three excellent illustrations may be found in the American Journal of Obstetrics, April, 1895, pp. 512-520, under the superscription "Some Remarks on Abdominal Surgery in China."

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(Cartledge-Bullitt.) Unilocular ovarian cystoma weighing 245 pounds removed by celiotomy. Adhesions extensive to abdominal wall, intestines and other viscera. Separation difficult, many ligatures required. Duration of operation two hours. Combined weight of tumor and patient nearly 400 pounds. Patient died seventh day after operation from intestinal obstruction.

(Cordier.) Ovarian cystoma weighing 165 pounds. Patient a much emaciated mulattress. Complete extirpation by celiotomy. Patient died shortly after completion of operation.[1]

(Mudd.) Multilocular ovarian cystoma—provisional diagnosis. Patient weighed 350 pounds. Estimated weight of tumor, 175 pounds. Operation refused. Paracentesis, indifferent success. No symptoms excepting from excessive weight of tumor. Final result not known.

(Barlow.) Ovarian cystoma observed at necropsy. There were 72 pounds of fluid in the sac, which weighed 50 pounds. On account of dyspnea from which the patient had suffered, 176 pounds of fluid withdrawn three days preceding death, making a total of 298 pounds.

(Lanphear.) Unilocular ovarian cystoma weighing 84 pounds removed by celiotomy. Few adhesions, pedicle small. Abdomen closed without drainage. Ideal recovery.

(Abbot.) The author reports four cases in which celiotomy was performed for the removal of large ovarian cysts. The first patient had been tapped five times at intervals of four to six months, between 10 and 50 pounds fluid withdrawn each time. Weight of fluid removed at operation 80 pounds, the sac weighed 11 pounds. The patient died from shock.

(Ibid.) In the second case weight of the fluid removed was 70½ pounds, sac 7½ pounds. The patient made an excellent recovery.

(Ibid.) Weight of the fluid and sac not shown in the third case, but the distance from ensiform cartilage to pubes was 38 inches; circumference of abdomen 56 inches. Patient recovered.

(Ibid.) In case four weight of fluid removed was 129 pounds; estimated weight of fluid lost, four pounds; of the unruptured cyst walls found at necropsy, 20 pounds.

[1] As a matter of reference for those who may wish to pursue this question further, a full bibliography covering Bullitt's collection of twenty-five cases will be found in the proper place at the close of this paper. Comparison of dates will show that several cases were overlooked by Bullitt at the time his report was prepared.

(McGirk.) Unilocular ovarian cystoma weighing about 75 pounds removed by celiotomy. Before operation patient weighed 146 pounds, afterward 68½ pounds. Few adhesions, pedicle small, requiring but two ligatures. Abdomen closed without drainage. Recovery excellent.

(Newton.) Multilocular ovarian cystoma weighing 90 pounds removed by celiotomy. Adhesions extensive to abdominal wall, peritoneum, intestines, etc. Combined weight of patient and tumor 199 pounds, abdominal circumference at umbilicus, 56 inches. Uneventful recovery.

(Shands.) "A 500 gallon ovarian cyst." Patient refused operation. Paracentesis practiced 130 times within seven years, about 500 gallons fluid being thus removed. Gradual emaciation and death.

(Spohn.) "Enormous ovarian cystoma." The abdomen extended from patient's chin to the ankles. When reclining on her side "on a three-quarters bed the abdomen had to be supported on two chairs; the patient could not reach her navel with her hands by one and a half feet; when her family wished to move her they rolled the tumor and she went with it!" Size of tumor gradually reduced by paracentesis, abdomen then opened and sac weighing 40 pounds removed. Total weight of tumor 328 pounds. The patient made a good recovery.

(Barkley.) Multilocular ovarian cystoma weighing 70 pounds removed by celiotomy. Extensive adhesions between cyst and parietal peritoneum and omentum, viscera free. Complete recovery.

(Ricketts.) Multilocular ovarian cystoma weighing 98 pounds removed by celiotomy. After removal of the tumor the patient weighed 85 pounds. Uneventful recovery.

(Fay.) Ovarian cystoma. Patient presented greatly emaciated body appended to an enormously distended abdomen; greatest circumference seven feet and three inches. Despite her emaciated body patient weighed 270 pounds. Abdomen tapped three times within ten days, fluid withdrawn weighing 150 pounds. After last paracentesis cyst removed; dense adhesions everywhere. The patient recovered from the operation, but died a month later from pneumonia.

(Knight.) Multilocular ovarian adenoma, some of the daughter cysts filled with thin "pea-soup" fluid. Total weight of solid and fluid contents, 111 pounds. The patient recovered.

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(Horsley.) Ovarian cystoma weighing 116½ pounds. Weight of patient, including tumor, 222 pounds. Abdominal circumference, 63 inches. Celiotomy, abdominal wall thin, cyst firmly adherent thereto, viscera free. Recovery.

(Cullen.) Provisional diagnosis, ovarian cystoma. Celiotomy revealed fibroid tumor weighing 89 pounds. Weight of patient before operation, 174 pounds, afterward, 85 pounds. Prompt recovery.

(Larkins.) Diagnosis, ovarian tumor, operation refused. Gradual emaciation and death few years later. Tumor removed post-mortem weighed 140 pounds. Extensive adhesions to abdominal wall, viscera free. Multilocular cystoma, contents purulent, bloody, gelatinous consistency. Body weight about 80 pounds.

Impartial consideration of the foregoing statistics directs renewed attention to the importance of prompt surgical removal of ovarian cystomata regardless of their size, provided the patient is in physical condition to withstand operation when observed by the surgeon. Brilliant results oftentimes follow operative treatment even in forlorn cases, and in the absence of valid contra-indications every patient should be given the chance of prolongation of life which surgery affords.

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ASSOCIATION OF INFECTION OF THE RIGHT ADNEXA WITH APPENDICITIS.

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The close anatomical relation of the right adnexa with the appendix, together with their lymphatic and peritoneal association, is responsible in many cases for combined infection of these two anatomical structures. The condition may be acute in one and chronic in the other, or acute or chronic in both at the same time.

The infection causing the trouble may first manifest itself in the adnexa and travel to the appendix over the peritoneal surface or by means of the lymphatics which run along the course of the right ovarian vessels, passing through the infundibulopelvic ligament and finally through the base of the mesentery of the appendix. In about 10 per cent. of women there exists an appendiculo-ovarian ligament, which is simply a fold of peritoneum extending from the mesentery of the appendix to the base of the ovary; this fold is said to be rich in lymphatics. Lastly, when the appendix is in the pelvis, it may become involved by continuity of tissue.

It is questionable whether a true appendicitis, that is, where the mucous membrane is affected, can take place secondary to involvement of the right adnexa, especially if the infection is of gonorrheal or even of mixed character, although there seems no doubt that the superficial structures may become inflamed and adhesions result. Many surgeons believe that a true appendicitis can take place only from an intrinsic infection. On the other hand, infection of the right adnexa secondary to appendicular involvement would be more likely, as the streptococci or colon bacilli which are usually the exciting factors are more virulent than the

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gonococci, and in extreme cases where nature is unable to wall off the appendicular area the pus may travel over the peritoneal surface, reaching the adnexa by gravitation; the infection may then invade the tube through the fimbriated extremity, the ciliated epithelium aiding in its distribution, or the invasion may be through the peritoneal covering of the tube. The ovary may be involved superficially, producing a periovaritis resulting in a thickened condition of the tunica, followed later by a cystic degeneration; or if perchance there is a recent ruptured graaffian follicle the deeper recesses of the ovary may become involved, resulting in an ovarian abscess.

The tendency of secondary involvement of one structure from the other will depend in a large measure upon the virulence of the infection, the susceptibility of the peritoneum to inflammation and adhesions and the power of resistance on the part of the patient. If the patient be in the parturient or menstrual state and be subjected to acute suppurative appendicitis, she becomes very susceptible to adnexal infection owing to the active condition of the blood-vessels and lymphatics and the congested state of the peritoneum covering the pelvic structures. There are many other conditions in the pelvis, such as ectopic gestation, retro-displacements, tumors, cystic or fibroid, which predispose the pelvic organs to the same infection. Streptococcic infection of adnexæ which is found most frequently in connection with abortions, miscarriages and labor at term, may cause a secondary involvement of the appendix through the medium of the lymphatics, as already mentioned, over the surface of the peritoneum, or by continuity of tissue when the appendix lies in close contact with the right adnexa. I believe it is questionable whether an acute suppurative process takes place from one to the other in rapid succession except in those cases where the structures lies in close apposition. I cannot recall seeing a single case of acute suppurative appendicitis on which I have operated and found a similar process in the right adnexa where I was satisfied that some previous condition did not already exist. On the other hand, I have observed several cases where we found a suppurative appendicitis with the right adnexa apparently healthy, and within a few months the tube, ovary, or both on the right side were removed for disease, the cause of which I had every reason to believe did not come from the uterine cavity. It would seem that the later secondary condition in the adnexa was due to the infection from the appendix which probably spread over the peritoneal surface to the pelvic organs.

Where the appendix and adnexa are adherent the history of the patient may throw some light as to which became first involved. If the starting point be in the adnexa there may be a history of gonorrheal or puerperal infection, and while the appendix may be found closely adherent to the tube or ovary, the superficial structures only as a rule are involved.

If, on the other hand, a suppurative condition exists in the appendix with adhesions to the adnexa, the latter with or without pus, one naturally concludes that the infection primarily began in the appendix. When there are marked adhesions between appendix and adnexæ, in the absence of pus, and especially if the left adnexa is involved, we conclude that the adnexa was first involved and that the etiological exciting factor had been the gonococcus or some other infection through the vaginal route.

Very frequently we diagnose a chronic salpingitis when on laparotomy it turns out to be a chronic appendicitis, and, vice versa, where both structures are involved there seems to be a reasonable excuse to diagnose the condition as tubal or appendiceal. Where, however, only one is involved it seems to me that we should sooner or later have brought to our notice some cardinal symptoms by which we can positively distinguish one from the other.

Take a case of acute suppurative appendicitis. We have the history of a sudden onset, probably a chill followed by a sudden rise of temperature; the sharp lancinating pain which at first may be more or less diffuse, later becoming localized to the right iliac fossa with a tendency to radiate toward the epigastric region; the point of tenderness which, as the hours roll by, becomes more or less limited to the McBurney point; the vomiting often present in the more virulent infections which are already involving the peritoneal surface; the spastic condition of the right rectus above the level of anterior superior spine, and the absence of tenderness in the vaginal vault. These symptoms in their aggregate are practically pathognomonic of only one condition.

In the case of acute infection of the adnexæ we probably have a history. If of gonorrheal origin

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there will be a vaginal discharge, frequent micturition, involvement of Skene's ducts or Bartholin's glands, bilateral pain, dull and localized, confined to lower abdomen or pelvis, slight rise of temperature and little or no acceleration of pulse. Vaginal examination produces pain in the vault on pressure, and there may be considerable tumefaction. If streptococcic infection there will probably be a history of the puerperal state, the patient showing all the symptoms that go with this condition. These symptoms are also practically pathognomonic of pelvic involvement, and like acute suppurative appendicitis we have little or no trouble in making a diagnosis. Occasionally we meet a case, particularly of appendicitis, where many of the symptoms enumerated are absent. I refer to appendicular abscess in the pelvis; although the symptoms are usually more acute than in any ordinary involvement of the adnexa, one may be led to make a wrong diagnosis, especially if there is any irregularity in menstruation.

Those are not the cases that are most difficult to recognize, as there are usually some symptoms on which we can base a correct diagnosis. My greatest difficulty from a diagnostic standpoint — my greatest surprise, when I do a laparotomy—is encountered in those women who come into the office complaining of pain at times in the lower right abdomen, with probably a very unreliable history as to the duration of the disease, or as to whether or not there was any trouble following confinement, and with probably negative symptoms as far as gonorrheal infection is concerned. The patient may give a history of intermittent attacks of pain in the lower right abdomen just prior to menstruation, but at the time of her visit may be fairly comfortable. You make an examination, abdominal and then vagino-abdominal, and much to your surprise, vaginal examination reveals no tenderness or thickening in the vaginal vault, although from the history you might have made up your mind that the trouble was in the adnexæ. We should be mindful of the fact that the ovarian artery runs through or close to the base of the meso-appendix and not infrequently sends a branch to the appendix. If such is the case in a chronically inflamed or adherent appendix, there will invariably be pain prior to the menstrual flow. I believe this is responsible for mistaking appendix trouble for adnexa disturbance in many instances. Where there are direct adhesions between tube and appendix the symptoms of both conditions blend and it is almost impossible to tell whether one or both are involved, especially where there are no marked symptoms of either condition. We freqeuntly encounter cases where there are many signs of adnexa disease, and yet on operation reverse conditions are found.

There are a few signs that may help to some degree in diagnosing a chronic infection of the adnexa from a chronic appendicitis.

In pelvic trouble the following points are of value:

1. A history of gonorrheal or puerperal infection, dating back even a considerable period, will often help us if this is borne out to any degree by physical examination.

2. Pain, which is generally low down in the pelvis, is of a dull aching character and usually confined to the pelvis alone.

3. There may be slight rigidity over the lower part of the right rectus muscle.

4. If the involvement is on the left side, there will probably be pain on defecation and a tendency to constipation.

5. Prior to menstruation there will usually be considerable pain.

6. On vaginal examination there may or may not be tenderness, but probably thickness in the vaginal vault.

7. The uterus will be fairly fixed, and if an attempt is made to move it, this will cause considerable pain.

8. If the cervix is caught with vulsella and an attempt made to draw the uterus down, a great deal of pain is experienced by the patient. This I consider the most important symptom where there is any difficulty in distinguishing adnexa trouble from appendicitis.

9. There may be a slight temperature and increased pulse rate during an acute exacerbation.

In chronic appendicitis the pain is most marked at a point one and one-half inches to the right and a little below the umbilicus, and on pressure it usually radiates to the epigastric region. There is also a spastic condition of the right rectus muscle from the level of the umbilicus to the level of the anterior superior spine of the ilium. This latter sign is probably the most valuable in distinguishing

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acute or chronic appendicitis from adnexal involvement. If the right leg is flexed on the thigh and the thigh on the abdomen and then extended quickly, pain will be quite marked if the appendix is involved. Any one or all of the above symptoms may help us to arrive at a correct diagnosis.

I herewith present a few interesting cases with their histories and gross pathological findings, many of them showing mistakes in diagnosis:

Case 1. Mrs. L., aged 44 years, married twenty-two years, had one child twenty-one years ago, but has never been pregnant since. For four months prior to February 15 last she did not menstruate and naturally believed herself pregnant. About February 10th she began to have severe pains in the lower abdomen, and thinking she was threatened with miscarriage went to bed, where she stayed for four days, when I was called to see her. I found the patient with a temperature of 105 and a pulse of 140, vomiting incessantly; her lower abdomen was as rigid as a board. On vaginal examination I found a fluctuating mass in the cul de sac, directed towards the right iliac fossa, and a slight bloody uterine discharge. I had her removed to the Polyclinic Hospital and operated on her within an hour. I passed a sound into the uterus and found it normal in length. On opening the cul de sac fully a pint of pus was evacuated. Both tubes and ovaries were free and apparently healthy. The condition was unquestionably an appendiceal abscess in the pelvis. The patient left the hospital two weeks later, has had absolutely no trouble since, and has not missed a single menstrual period.

Case 2. Mrs. M., aged 44, married twenty years, has had four children, the youngest ten years old. She has had no miscarriages and was always regular in her menstruation. Seven years ago she had an attack of severe pain in the region of the appendix which I diagnosed as appendicitis. She refused operation and under palliative treatment with ice bags, etc., she recovered. I remember at the time of making a careful examination of her pelvic organs, but nothing indicating right adnexal trouble was found. I was called to see her again last May, when she gave a history of having had several slight attacks of pain during the past seven years. At this time she was suffering a good deal and was persuaded to be operated on. After pelvic examination I again made a diagnosis of appendicitis. Nothing was detected in the pelvis. A laparotomy was done the following day, when the patient was found to be suffering from a thickened and adherent right tube which was removed. The appendix appeared to be in a healthy condition, no adhesions were found.

Case 3. Mrs. K., aged 34, married twice, three children by first husband, no miscarriages. She had been married three months to her second husband when I was called to see her, having been three days sick in bed. She last menstruated six weeks previously and was now flowing and complained of terrific pain in the lower abdomen. Temperature 105; pulse 130. Vaginal examination revealed marked bulging in the cul de sac. Induced abortion was suspected. I had her removed to the hospital, where the cul de sac was opened and the pus drained. Both adnexæ were free and floating in the pus, which was due to an appendiceal abscess in the pelvis. Nothing was found in the uterus. The patient went home two weeks later. At the end of three months she began to suffer pain in the region of the right adnexa. On examination a distinct mass was easily palpable. Laparotomy was done and a tubo-ovarian abscess removed, as was also the stump of the appendix, which was completely buried in adhesions, but was not attached to the adnexa. Her last operation was in March, 1912. The patient gave birth to a fine son five weeks ago.

Case 4. Mrs. W., aged 44, married twenty years, has had three children, the last one eighteen years ago; no miscarriages. She had always enjoyed good health until a year ago, when she had some menstrual irregularity and believed the change in life was approaching. While taking a vaginal douche she experienced considerable pain which she attributed to the nozzle. She thought little of it until three days later when she again began to have pain, more or less continuous, in the lower right abdomen and in the region of the uterus. She called her physician who found the patient had a high temperature and accelerated pulse. Manual examination revealed a large tender mass in the pelvis which extended above the pubes in the median line and apparently involved the right adnexa. I saw her the same evening and made a diagnosis of probably infected fibroid. The cul de sac was opened, but very little drainage obtained. The pa-

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tient was returned to bed, but her symptoms, particularly the temperature and pulse, did not improve. One week later a laparotomy in the median line was done over the mass; on opening the peritoneum pus escaped freely; the abscess cavity was well walled off. We stopped right there, packed the wound with iodoform gauze, and returned her to bed in a very bad condition. Three months later the wound was still discharging. She submitted to another operation when it was found that the right tube and appendix were adherent to the fundus of the uterus, the sinus leading to the tube.

Case 5. Miss G., at the time of her trouble, four years ago, was sixteen years of age. Menstruation began at the age of fourteen and without disturbance. When I saw her she had been sick about a week; specific infection had been suspected. Her temperature had been running from 102 to 104, pulse 100-120, and she complained of severe pain in the lower abdomen. Recto-abdominal examination revealed a mass filling the right side of the pelvis. The hymen was intact and there were no signs of vaginal infection. I suspected appendiceal abscess in the pelvis and drained her through the cul de sac, but could not reach the apparent original focus which was above the brim of the pelvis. A laparotomy was immediately done, a gangrenous appendix found and removed. The right adnexa appeared to be healthy; drainage was established through the abdominal incision and the cul de sac, the drains meeting in the abdomen. Four months later the patient again began to complain of pain in right side of the pelvis. A distinct mass was easily made out, and on operation a large cystic ovary found and removed. The patient has been healthy ever since.

Case 6. Miss O., at the time of her trouble, which was last fall, was eleven years of age. She had complained of repeated attacks of severe pain in the lower right abdomen and had a temperature of about 100 when I first saw her. There was marked tenderness in the region of the appendix with rigidity of the right rectus muscle. I made a diagnosis of appendicitis and sent her to the hospital. She was kept there under observation for a couple of days, hoping that the symptoms would subside, as the patient was otherwise in splendid condition, but as there was no relief from the pain, I decided to operate. Up to this time no recto-abdominal examination had been made, but when the patient was placed under the anesthetic a distinct mass could be felt in the pelvis which extended above the brim. A laparotomy revealed that she was suffering from a large multilocular cyst with a twisted pedicle. The appendix was apparently normal.

Case 7. Mrs. B., aged 30, married, had two children, no miscarriages. Three years ago, while eight months pregnant, she was taken to the hospital suffering from acute suppurative appendicitis and the abscess was opened and drained. The patient aborted the following day and for nine weeks her life was practically despaired of; however, she recovered and went home. Three weeks later the wound began to give her trouble, and she returned to the hospital where the point of original incision was reopened. I saw her about two months later. The wound was still draining and gave me the impression that it was a fecal fistula. On examination of the pelvic organs I found the pelvis full, the uterus extending up in the median line to near the umbilicus. The patient went into the hospital, and laparotomy revealed a pair of pus tubes and a large infected uterus, plus a fecal fistula. Supra-vaginal hysterectomy was done and the fistula closed. Three months later the median line incision broke down, and this was followed by a ventral hernia which has since been operated on and the patient is now in a healthy condition.

Case 8. This was the most interesting one of all. Mrs. N., 32 years of age, married ten years, two children. She missed two menstrual periods and believed herself pregnant. Severe pelvic pains developed and she called her family physician, who made a diagnosis of ectopic gestation from the history and a mass in the pelvis. The following day the patient had a slight uterine bloody discharge and the mass in the pelvis on both sides appeared to have enlarged. He believed its sudden increase in size was due to the hemorrhage from the ruptured ectopic, and from her history I naturally fell in line. I could not quite understand why there was such a slight variation in her pulse which was about 90, the temperature being normal. We removed her to the hospital and operated on her. Incision was made in the median line, and a 2½ months pregnant uterus popped into the abdominal wound. On examination of the right adnexa a tubo-ovarian ab-

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scess was found with the appendix included in the mass. On the left side was a pyosalpinx with the fimbriated extremity closed. The patient aborted five days later, her temperature at no time going above 100.

In conclusion I simply wish to say that I believe that an interstitial appendicitis does not take place secondary to infection of the right adnexa. On the other hand, I believe that infection of the right adnexa frequently is secondary to suppurative appendicitis. I know of no positive symptoms whereby a chronic appendicitis can be distinguished from a chronic salpingitis, except in those cases where the classical symptoms already mentioned are well marked.

349 W. 51st St.

TETANUS — PREVENTION RATHER THAN TREATMENT.*

By THOS. H. HANCOCK, M.D., Atlanta, Ga.

Tetanus, trismus and lockjaw are three terms meaning the same thing. It is a disease caused by the tetanus bacillus of Nicolaier which more frequently develops in a wound that has been exposed to soil, especially that around stables.

The bacilli are not found in the blood or any of the viscera. Tetano-spasmin is the toxin produced by this bacillus, and it is regarded as the cause of the tonic convulsions, being many times more powerful than strychnine.

The symptoms are nervousness and apprehension followed by a continuous state of contraction of the muscles. The pulse, temperature and respirations are variable, and may reach 160, 112 deg. F., and 60 respectively. The body may be bent forward, emprosthotonos, laterally, pleurosthotonos or backwards, opisthotonos.

Gordon pointed out that Sawamura (1909) recognized three kinds—tetanus ascendens, tetanus descendens and mixed tetanus. The local muscles are affected first in the ascending form. It ascends the limb, then goes to the opposite side and finally up the trunk. This is the most common type in experiments on animals after subcutaneous or intramuscular injections.

Tetanus descendens is most common in man and the horse. The jaw and neck muscles are the first to be affected; then the disease spreads over the whole body. It is graver than the first mentioned variety. Both of the above forms occur in the mixed.

The chance of life depends: first, upon the period of incubation, a few hours to several weeks, usually within three weeks; second, the rapidity of the onset and severity of the spasms; third, the duration of the disease. The period of incubation is the most important and the rapidity of the onset next. Kauthock has said: "Fatality is in direct proportion to the rapidity of the onset and inversely proportional to the duration of the disease."

Vaillard and Vincent showed in 1891 that, when freed of adhering toxin either by washing or by heat, neither the bacillus tetani nor its spores caused tetanus in animals by simple inoculation, but would produce it, if the tissues were bruised by pinching them with forceps, or if lactic acid or bacillus prodigiosus or its filtrate was injected. They attached an important role to the associated bacteria, stating that the early development was due to the association of the virulent bacteria, and hence these cases were the most fatal. The anaërobic bacillus of Welch is the most important of these associated bacilli.

Kane gives a mortality of 94 out of 134 cases. Tillman claimed that only 33 out of 93 died.

The various text-books give the mortality at from 80 to 90 per cent. Dr. C. K. Austin reported in the *Medical Record,* November 14, 1914, that Doyen of Paris, who employs intraspinal injection of first 60 c.c. of serum and two days later of 40 c.c., the patient being tilted backwards at an angle of 45 degrees, claims a mortality of only 12 per cent., while all of the other surgeons report 80 to 90 per cent. from their treatment.

Dr. David St. John reported a number of cases successfully treated with morphia. A finger was amputated in one of the cases recorded by him. It is not stated whether the finger was amputated before the onset or afterwards. Dr. Joseph Blake used Epsom salts, 1 c.c. of a 25 per cent. solution for every 14 pounds of weight, but stated that an anesthetic is required. Dr. W. R. Berrs of Central America recommended tartar emetic, gr. 1/4 to 1/6, every two or three hours. Roux and Borrell think that a few drops of tetanus antitoxin in the brain will cure the disease better than large quantities introduced into the blood or under the

* Read at the meeting of the Central of Georgia Railway Co. Surgeons, Birmingham, Ala., May 6, 1915.

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skin; but that there is a stage in tetanus beyond which antitoxin is of no avail in whatever way it is employed. Chloral hydrate by rectum, 40 to 70 grains, has been advocated, and so on down the line one drug after another.

Your pardon is asked for my going into the above resume which has been culled from one place and another. I wish to stress the importance of prevention. We know how to stop the development of small-pox, typhoid fever, hydrophobia, diphtheria and probably tetanus. Therefore let us not leave anything undone from the beginning. It is a question of what to do when one has stuck a nail in his foot. Each of us has seen a number of such cases, but few have seen tetanus develop. It is a question in my mind whether we are justified in opening up these wounds under an anesthetic or not, and they may not be properly cleansed unless we do. My rule has been to wash the outside of the foot thoroughly, apply hot flaxseed poultices and give at once 1,500 units of tetanus antitoxin. The country people where I was reared used to pour oil of turpentine into these wounds, and it was a good idea, for on being exposed to the air it absorbs oxygen and acquires powerful oxidizing properties which hinder the tetanus bacillus, which is anaërobic. Potassium permanganate solution and peroxide of hydrogen are also useful in the same way. Tetanus antitoxin, however, has given the greatest success as a prophylactic.

This dreadful disease is not very frequent in our railroad work, fortunately. Only one case has developed in my practice and I did not anticipate it in this one. A man had his foot crushed and I tried to save it—had saved similar cases. The wound was thoroughly washed with water and tincture of green soap, followed by alcohol and then a 1-1000 sublimate solution. It was then dressed and the dressing kept moistened with a Listerine solution, 1-4.

I do not recall the number of days before the first symptoms of tetanus descendens, stiffness of the jaws, developed. He had an abscess of a tooth and the stiffness was attributed to that at first. Antitoxin was given in large doses subcutaneously and a number of other drugs were used, but he died on the sixth day.

Last year I saw a six-year-old boy who had been struck on the head with a stone. The attending physician sutured the wound, which became infected and tetanus ascendens began to show on the sixth or seventh day. He had tonic spasms of the muscles generally, but the jaws were never absolutely locked. When I saw him the wound was opened at once and hot flaxseed poultices were applied. Tetanus antitoxin, 3,000 units, was given subcutaneously daily for six days and he also received chloral hydrate per rectum. The symptoms began to disappear in about a week and he made a slow recovery. It was about a month before he could walk well.

Several months ago a man fell from his motor cycle suffering a contused and lacerated wound above his left knee. The wound was cleansed, as far as I could learn, in the usual way and a dressing applied which was kept moist with a weak lysol solution. Tetanus developed on the seventh day, and when I saw him he was nervous and anxious. He complained of stiffness in his jaws and neck. Tetanus descendens was diagnosed, and large doses of antitoxin were injected subcutaneously at first, later intravenously, and lastly into the spinal canal; but he was too far gone for the last method to have a fair trial. The antitoxin may be diluted with sterile water before injection into the veins, but it will make a precipitate if mixed with the normal saline solution. This patient's jaws were completely locked, but under chloroform anesthesia they could be pried apart for inserting the stomach tube for giving nourishment. He received numerous injections of morphia without atropia, as the latter made his throat too dry. A number of the drugs mentioned above were also administered, but he gradually grew worse and death closed the scene on the seventh day. These three cases could have all been prevented, if they had received the proper treatment from the beginning, I believe.

A few days since a claim agent of a railroad gave me the following history: A man let a tie fall on his great toe on April 21 last, and that day the distal phalanx was amputated. Tetanus developed on the 25th and he died four days later. The claim agent was surprised that tetanus could develop so early and asked me if it was due to the operation or to the attention that the wound received subsequently. No opinion was given and he was advised to settle the claim, if there was any liability.

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This paper has developed nothing new, but I would insist that, if there is any doubt about the sterilizing of a wound, tetanus antitoxin should be always administered at the earliest possible moment. If the disease has already developed, and the wound is in a finger or toe, it is my opinion that an immediate amputation should be done. If it is in a larger member, a general anesthetic should be given and the wound cauterized with the actual cautery very extensively with the hope that the tetano-spasmin will cease to develop, and that we shall have to deal only with that which is already in the system.

I have not seen this suggestion anywhere, but it seems to me to be worth trying. If I am unfortunate enough to have to treat another case, I shall first draw off a syringeful of the spinal fluid and in its place inject very slowly 5,000 units of the tetanus antitoxin undiluted, repeating this every day till there is a change. I shall also employ morphin, chloral and chloroform.

It seems to me that a cure has not yet been found.

TETANUS — REPORT OF CASE. RECOVERY.*

By C. O. Boynton, M.D., Sparta, Ill.

Since the germs of tetanus are so often found in the earth or dust, tetanus is to be considered as a possible complication in any lacerated or punctured wound. This is my excuse for offering a report on what to me was a very interesting case. I shall not consume your time and patience by detailing to you the definition, varieties, acute or chronic, with their subdivisions, etiology, bacteriology or diagnosis of tetanus, for no doubt you are familiar with these data which are to be found in every text-book. I shall limit my remarks to a brief description of a traumatic case of tetanus with the treatment employed.

On July 28th, Mr. T., a farmer, injured his great toe, the nail being removed. He bathed the foot and applied some home liniment. In a few days the wound healed without pain and seemed to be doing well. Thirteen days after the injury the first symptom noticed was a stiffness of the muscles on rising. In a few hours this disappeared, excepting a slight stiffness of the body and neck, which persisted the next day and was slightly aggravated the following one. The day after, his condition was a little more severe, the stiffness extending into the muscles of the face and drawing down the angles of the mouth. Difficulty in swallowing also was noticed. The stiffness extended into the muscles of the back, chest and thighs. On the fifth day he again went to the field to plow, wearing an overcoat to force the perspiration, now thinking he had rheumatism. Twice this day severe spasms threw him violently to the ground. By the sixth day, nineteen days after the injury, he called a physician. The liniment used seemed to drive the contractions or twitchings to the epigastrium, and they then spread all over the body. He likened them to severe, uncontrollable hiccoughs, being unaccompanied by pain at any time. On the seventh day small doses of chloral were given every four hours, which would relax him somewhat. By pressing the feet firmly against the foot of the bed he could be turned, rigid, like a log. Even a slight noise or draught would bring on a spasm. These would recur regularly every three to fifteen minutes, day and night, sleeping or awake, all muscles seeming to be involved. A severe opisthotonos was present while the spasm lasted, and never during comparative relaxation was it possible to bend forward the smallest degree.

Through the courtesy of Dr. J. G. Beattie I saw the case on the eighth day. As it is essential to destroy the source of the toxin and eliminate germs which remain at or near the port of entry, we immediately removed the matrix of the nail and surrounding tissue under quinine and urea hydrochloride anesthesia.

A few months earlier a fully developed case of tetanus was presented us for treatment. Exhaustive search of all the literature at our disposal led us to try Bacelli's carbolic acid treatment, which consists in the use of one to two drams of a two per cent. solution of phenol, the loose unfused crystals, injecting it along either side of the spine every two hours. Although persistently followed and reinforced by chloral and hypodermics of morphia, the case continued to progress unfavorably to the end.

In desperation, anti-tetanic serum was given to Mr. T., reinforced with hypnotics and eliminants.

* Read at twentieth annual meeting of Association of Surgeons of Southern Railway, Asheville, N. C., June 2-4, 1915.

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Within five hours of the time I first saw him, the patient received 10,000 units of serum, which we had sent us from St. Louis by special messenger. The intravenous method of administration was preferred, but since nearly all of the injections had to be given by a lay nurse, the intramuscular method was chosen. He received from 5,000 to 10,000 units once in four to six hours until 288,000 units had been given. His mind remained clear throughout, save for a day or two, and he always claimed to feel better for a while after each injection; he begged for it until he got the last dose, when he no longer felt the craving. His pulse was 140, with a temperature of 101 degrees, when the serum was first given. These varied somewhat, the pulse remaining high and the temperature not running over 102½ degrees for several days. Any sweet, sour, or highly seasoned food caused strangling, and swallowing was always difficult. He was given liquid nourishment through a bent tube, taking a daily average of from six to ten eggs in orange juice or egg nog, nutrient soups, and for a while one quart or more of milk. Later this caused some flatulency and created a severe disturbance. Three days before discontinuing the serum the pulse shot up to 160 with a temperature of 106 and wild delirium. He was promptly packed in ice. Although salines and cascara had been administered daily, calomel and soda were exhibited followed by a saline in large quantities, which in twenty-fours cleared up these severe symptoms. His mind again became clear and the temperature fell to 102. Ice bags to head and spine alone were continued for a day longer. No more milk was given. Two days later, nine days from beginning, he received the last dose of serum. The temperature, pulse and respiration were normal; the next day the perspiration was very profuse; there were no more spasms, but rather severe twitchings continued for a week longer when he was able to rise up in bed without assistance. Three days later a sudden opening of a door caused severe twitching of the muscles, the last time this phenomenon was observed. The jaws did not completely relax until September 11th, thirty-four days after the first symptom of tetanus. The shoulders and calves of the legs seemed stiff for three months. The patient had very little restful sleep until the twenty-seventh day; the jaws during all this time had to be tied shut to prevent biting of the tongue when the spasms would come.

It has been our practice to suggest the prophylactic dose of 1,500 units in wounds that might be infected with tetanus, at the same time thoroughly cleansing, draining and covering them with moist antiseptic dressings, and we have never seen a case develop. A case occurred here following a gunshot wound of the foot, which happened a few weeks after the one just reported. He received the usual bromide-chloral-morphia, etc., with a single prophylactic dose of serum a day or two before he died! In view of the mortality rate of 88 per cent. according to the military statistics of Richter, and the death of three in my own community who did not receive serum, and in view of the apparent reaction after each dose, I am inclined to believe this remedy, exhibited in large doses, was *the* factor in the recovery of the above case.

SURGICAL EXPERIMENTATION UPON ANIMALS.

By LOUIS W. KOHN, M.D., Scranton, Pa.

By animal surgery only can we ever hope to eliminate experimental human surgery. There is no knowledge more useful to the physician and surgeon than knowledge of himself. By means of it he can promote the future welfare of his entire organism. Now, if such be the case concerning himself, why cannot this knowledge similarly influence the lives and bodies of his patients, and even further than that, of the entire human race. Years of patient study and investigation on the part of scientific explorers have revealed wonders which have revolutionized and benefited both medicine and surgery. These workers in scientific research have clearly demonstrated that human beings are animals, and have even gone further by proving the kinship of all animals. It is, therefore, very evident that by advancing our knowledge of the lower animals, we learn more of ourselves, a fact we need not be ashamed of. Something that has a bearing on man can always be learned from every living thing.

Animal experimentation has built up the science known as biology, which treats of living beings. and embraces all those branches upon which our profession is founded, viz., anatomy, physiology,

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histology, embryology, chemistry and physics. By study and investigation of these various branches, we have become acquainted with the existence of morbid processes which affect the animal world. Then, of course, further animal experimentation had to be resorted to in order to effect a cure of these diseased conditions. One of the methods of accomplishing this is the mechanical art known as surgery.

We all have heard of the wonderful advances made in the various departments of the sciences. Alexis Carrel of the Rockefeller Institute and others have done very notable work upon animals, the results of which have gained for them signal distinction and honor. Physiologists have carried out experiments upon animals, which have brought them fame, and pathologists and bacteriologists have besome so impressed with the importance of this work that it has become indispensable in their researches. Of course, I do not intend to delve into all the branches in which animal experimentation may be an invaluable aid in promoting scientific progress. I refer only to that part of the subject with which I have been rather closely connected, and it is, therefore, only from the surgical aspect that I can relate some experiences.

It is a well-known fact that the lower animal and the human being are afflicted with the same surgical ailments. The same vital processes in their various phases have been shown to exist in the tissues of all animals during disease as well as during the stage of repair or healing. Therefore, it would appear but natural that surgical procedures, whenever possible, should be carried out first upon the lower animal rather than upon the human being. This close relationship between the two imposes such an obligation upon all beginning the practice of surgery.

We cannot appreciate the value of experimental surgery upon animals until we have discontinued such work upon animals for a long time, or when suddenly called upon to perform some delicate operation that does not present itself daily. By this work we could have perfected ourselves for undertaking any kind of surgery at any time. With all the objections to vivisection given an unbiased hearing, if you were to cite only one death of a human being due to a lack of experience on the part of the surgeon, which experience could have been acquired by animal experimentation, any judge would render a verdict in favor of vivisection. The surgical experience acquired by work upon animals undoubtedly stimulates acumen and dexterity and inspires self-confidence.

According to the assertions of experienced surgeons an operation upon a human being is ordinarily much more simple than upon an animal such as a dog, because of the greater space afforded for manipulations. The technic in detail, however, is practically a repetition of the experimental work as performed upon animals. The main responsibility that burdens the surgeon is in operating upon a human being, and by consistent work upon animals, confidence comes to the front and vanquishes any temerity or nervousness that may have been occasioned by such responsibility.

Through this work we have improved our surgical procedures upon the brain, nervous system, vascular system, etc. We have even gone further and accomplished transplantation of bone and of various organs. In fact, nearly all surgery owes its origin to early animal experimentation. Of course, many morbid conditions found in earlier days during exploratory operations upon the abdomen, such as appendicitis, ulcers of the stomach, peritonitis, typhoid perforation and gall-bladder disease, have required more or less experimental intervention on the part of the surgeon. But of late years animal surgery has aided even here in the perfection of the operative technic.

Such work upon animals has been conducted for the past two years by Dr. A. H. Bernstein, myself and others, and it has given us a great deal of satisfaction. We have been convinced that too many young men having surgical ambitions, but no especial aptitude or experience, thrust themselves forward as surgeons without ever having attempted to practice upon animals for their preliminary knowledge and without ever having distinguished between the values of human and lower animal life. There are altogether too many human sacrifices made at the beginning of his career by the would-be surgeon, and these may have been avoided by previous operative practice on animals.

We will now take up the various pre-requisites

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for this work. First of all it is necessary to have a room wherein the animals are to be confined and also a kennel or recuperating room to which they can be transferred immediately after operation. The floor of this kennel is so arranged as to allow its being moved upon rollers. By this arrangement it can be removed, the animal placed thereon, and returned to its former position into the kennel. There the dog remains until it recuperates sufficiently to allow dismissal into the open room with the others.

An operating table is, of course, required. There are various kinds in use; the one we employ, kindly loaned to us by a Scranton veterinary surgeon, has every good feature and closely resembles the latest model operating tables in our hospitals, although on a smaller scale. It can be raised or lowered at either end, or revolved as the exigencies may demand. Its top is concave and covered with zinc and has steel hooks at the sides to which the dog's extremities can be fastened, straps made from hemp rope or heavy tape being used for this purpose. A strap is also tied around the dog's jaws for safety from biting.

However, before attempting any work upon these animals, we aim toward a complete abolishment of the reflexes and complete loss of sensibility. This is accomplished by first (about two hours before operation) giving the animal a hypodermic injection of morphin sulphate, four grains to a dog of average size. With a very small animal, two or three grains only may be necessary. Just before the operative procedure chloroform is administered by the drop method, care being taken that the animal is well anesthetized before starting. Of course, the site of operation is given the necessary aseptic and antiseptic preparation.

We have accomplished some rather difficult surgery during our recent service at the State Hospital of Scranton. The mortality in our surgical work in the past has been greatly reduced since resorting to animal experimentation, to which we feel constrained to credit our improved statistics.

We have often undertaken upon these animals such procedures as intestinal anastomosis, resection of bowel, gastroenterostomies, partial gastrectomies, colonic fixation, splenectomies, removal of gallbladder, nephrectomies, partial and complete thyroidectomies, etc. These various operations have been performed repeatedly upon dogs, which were watched and taken care of until complete recovery had taken place. Frequently we have performed several operations upon the same animal.

You all well know the methods and technic employed in these various operations, and I deem it unnecessary to burden you with a description in this paper. I can assure you, however, that frequent operative work upon animals is bound to make a master of the operator and will enable him to undertake his work upon the human body with such skill, deftness, courage and assurance as would otherwise be acquired only by a vast practical experience. Such has been our practice during the past two years, and we attribute a great deal of our success at the State Hospital (with a mortality less than three per cent. in a variety of dangerous and serious cases) to the continued experimental surgery upon dogs.

Hoping that I have impressed upon you all the importance of surgical experimentation upon animals and its relation to surgery upon the human being, I thank you for your kind attention.

THE MODERN TREATMENT OF BURNS.*

By THOMAS J. TUDER, M.D., Keokee, Va.

In the registration area of the United States for the year 1912 5,740 deaths were reported from burns, and in my state, Virginia, during the year 1913 there were 246 deaths from burns, while there were only 137 deaths from appendicitis. Dr. Charles F. Pabst, Coroner's Physician in Brooklyn, has just compiled the statistics for 1914 and reports 185 deaths from accidental burns in that city alone during the year, and he says that at least 90 per cent. of these resulted from carelessness.

He has just announced what he considers an easy and efficient method of fireproofing the clothing of children. One pound of ammonium phosphate is dissolved in one gallon of cold water. This gives a clear solution in which the fabric to be fireproofed is soaked for five minutes; it is then taken out and dried, after which the garment may be worn with safety. The

* Read at twentieth annual meeting of Association of Surgeons of Southern Railway, Asheville, N. C., June 2-4, 1915.

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solution keeps indefinitely, is non-poisonous, does not harm the fabric, and the ammonium phosphate retails at about twenty-five cents a pound. Such articles will remain fireproofed until washed or drenched with rain, after which the process must be completed again. He recommends the use of this solution as a safety measure, which should be employed for pageants, carnivals, receptions where flimsy draperies are used, scenery and properties in theatrical productions, and at all amateur Christmas displays. The popular cowboy and Indian suits with their flimsy fringes are particularly dangerous unless fireproofed. He states that the American Society for Fire Prevention and several public safety committees have approved this method of fireproofing and are urging its general adoption. It is earnestly hoped that it will fulfill all the claims made for it.

When we consider the fearful toll of human life from burns, and then think that for every death reported how many more have endured the most agonizing suffering, and what proportion of these have been condemned to life-long mutilation of the most repulsive character, we cannot fail to wonder why our boards of health and other educational agencies have not made more strenuous efforts to prevent this mortality and morbidity. The universal open grate, the cumbersome restraining garments of little girls, careless handling of oil, gasolene, caustics, acids, etc., unprotected steam pipes in shops and factories, and the training of employees about boilers and engines as to the precautions that they should take are some of the problems that should engage our most earnest attention.

The old classification of burns into those of the first degree, characterized by redness without vesication and involving only the superficial layers of the skin, those of the second degree, characterized by the formation of vesicles and bullæ and involving the corium, and those of the third degree destroying the skin and partially or completely carbonizing fat, fascia, muscles and associated structures, serves best for our purpose.

Since the results are about the same clinically in burns occurring from contact with dry heat, acids, or caustics, and scalds from hot liquids or steam, the treatment in a general way, excluding the neutralization of caustics, is the same (Klauder).

Severe burns are always accompanied by shock, and this should demand our first attention. Morphin hypodermically for the pain and other stimulants such as atropin, camphorated oil, caffeine, or digitalin should be administered at appropriate intervals, but in this condition I do not give strychnia, for it will cause the heart to use up more rapidly its failing strength and will not quickly add strength or tone to the cardiac muscle. The patient should be well wrapped in warm blankets, hot water bottles placed about the unburned parts of the body, pillows removed from under the head, and the foot of the bed elevated, if necessary. Normal saline, warm, with a little adrenalin added, or glucose-soda solution should be administered continuously during the stage of severe shock by enteroclysis. Oxygen inhalations, if available, should be employed when the condition of shock is grave.

As soon as the patient revives sufficiently we should consider the treatment of the burn. It should be remembered that in the infliction of a severe burn the heat has sterilized the affected area, but it is customary for the surgeon to find upon his arrival that some filthy preparation of grease or oil has been applied which adds considerably to the danger. If not satisfied that the parts are sterile, they should be cleansed as promptly and as effectively as possible with sterile normal saline, hydrogen peroxide, tincture of green soap, and, if there be grease or oil or much dirt, benzine followed by alcohol. Tincture of iodin is so generally used as an application to dirty wounds that we naturally think of it in connection with burns, and it has been used for this purpose, but is too irritating.

We have now treated the pain, combated the shock, and have the burned area as clean as it is practicable to get it, and from here on there is a wide divergence of opinion as to the best treatment. For a long time carron oil, named after an iron foundry in England where it was first used for accidental burns of laborers, made by mixing equal parts of linseed oil and lime water, was the most popular application, and it is still used to some extent. It excludes the air and relieves the pain, but, is practically always followed by infection, and the preparation itself rapidly undergoes decomposition; hence it is rapidly going out of use, and those who cling to it usually incorporate

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with it some antiseptic agent such as phenol, one per cent.

Various ointments, usually having as their base lanolin or petrolatum, and as their antiseptic agent boric acid, picric acid, phenol, salicylic acid, zinc oxide, etc., have been widely employed in the treatment of burns of all degrees of severity. Ichthyol ointment is a great favorite. These preparations are frequently far from aseptic and tend to macerate the tissues with which they come in contact and prepare the area for the multiplication of the bacteria already present there or conveyed with the ointment, and if the antiseptic agent is incorporated with the ointment in sufficient strength to prevent germ growth it will interfere with or prevent epidermatization.

A variety of moist dressings have been used and are still popular. A saturated solution of bicarbonate of soda is very effective for relieving pain. The burned part may be immersed in it, or covered with gauze kept constantly moist with this solution. Sterile normal saline solution may be used in exactly the same way. A paste, made by adding boiled water to bicarbonate of soda and applied over the burned area and wrapped with gauze, is an ever available home remedy for burns, which should be more widely adopted instead of filthy salves and oils. Solutions of chloral hydrate and aluminum acetate applied with gauze have been employed.

Probably the best and most widely used moist dressing for burns is a saturated aqueous solution of picric acid. This agent is soluble in water, 1.2 per cent., and in alcohol, 10 per cent. Ehrenfried's experiments led him to conclude that picric acid is fifty times more active as an antiseptic than the same strength carbolic acid solution. It coagulates albumin, and over a clean denuded surface a protective aseptic scab is formed by the coagulation of the secreted serum, the ruptured lymph spaces are sealed, the exposed nerve endings protected, and the wound is splinted so that epithelial proliferation may proceed. If pus becomes confined beneath a scab, it should be removed promptly.

Ordinary sterile gauze is applied in several thicknesses over the burn and thoroughly saturated with the picric acid solution, and over this oiled silk and a gauze bandage are placed. This excludes the air and usually relieves the pain promptly. The solution is bland, unirritating and analgesic. I leave some with the patient and direct that the gauze be saturated with it whenever the pain returns. About the third or the fourth day the dressing is renewed after all vesicles are punctured, and this is repeated once every four or five days until healing is complete, or oftener if there be suppuration or infection. First and second degree burns usually heal rapidly under this treatment, and the patients complain of very little pain. Systemic toxic effects have been reported from the use of picric acid solution over wide areas, but while this is of rare occurrence, the urine should be watched closely and if it becomes cloudy the applications should be stopped. Picric acid has also been extensively employed as an ointment, usually incorporated in petrolatum in the strength of two to ten per cent., but, while it is one of the best ointments available, the general objection to them all outlined above also applies here.

The open air treatment of burns, which is becoming more and more popular year by year, will doubtless be the method of the future, and I should not be surprised to see the day when we will discard occlusive dressings in a great many other kinds of wounds and injuries. Last month a patient of mine was struck by a stone, and sustained a deep wound involving the skull and reaching from the base of the nose to the middle of the forehead, with a fracture of the nose. The case was seen by me two hours after the infliction of the injury. Bleeding had been profuse and the patient was very weak. By light pressure over the wound this was soon stopped, but as the wound was so filthy and had been inflicted with a stone picked up from a barnyard, I was afraid to take any stitches in it and merely left it gaping open after applying tincture of iodin. A gauze dressing was employed with a few turns of bandage around the head loosely applied. The next morning both eyes were injected and there was frightful edema of both upper lids. I removed the dressing and found that the swelling had approximated the edges of the wound, all but half an inch in the center, from which serum and blood were slowly exuding as well as from the nose through the fracture. I left the dressing off

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entirely, and in five or six hours the swelling and the scab had filled in the intervening space. The patient made an uneventful recovery and in eight days was practically well. You will pardon this digression, and I believe many of you will agree with me that the open air treatment of septic wounds has not received the attention that it deserves.

In the open air treatment of burns, the area, if not already sterile, is cleansed in the usual way; blebs and all necrotic tissue are removed as soon as practicable and the entire area is left open; the lesions are exposed to the sunlight at first for half an hour, this time being gradually increased to an hour or more each day; the temperature of the room is kept high to favor drying and the action of the skin, and the air is kept as clean and pure as possible. The pain under this treatment usually soon subsides, but as the suffering is ordinarily more intense in burns of the first degree because of the nerves being exposed, whereas in those of the third degree they are destroyed, in the former I frequently employ the picric acid applications for the first few days, if the pain be agonizing when the patient is first seen, and then later resort to the open air method. Another reason for sometimes beginning treatment with the picric acid solution is that when you direct that the open air method be used many a patient will think that you are doing nothing for him, and will either call another surgeon or some old woman of the neighborhood, and the last state of that patient may be worse than the first. Bland dusting powders are applied daily in this open air treatment, and stearate of zinc and zinc oxide are the favorites. Vesicles are always evacuated promptly as soon as formed, and whenever pus is found the scabs about it are removed and the parts thoroughly cleansed with normal salt solution or hydrogen peroxide and then covered lightly with one of the above dusting powders. This treatment is particularly difficult in many homes where burns occur in any but the exposed parts of the body. However, among the more cleanly by strict attention to bed and body linen, changing both at least once a day and cradling the bed clothing over the burned parts, and by bathing and cleansing the unburned portions of the body at least daily, we may confidently expect good results.

This and the picric acid treatment are suitable for burns of all degrees of severity and in all stages. Whenever there is considerable loss of skin and there are not sufficient islands of epithelial cells scattered about over the burn to insure prompt regeneration of the skin, grafts should be applied as soon as the area is granulating and sterile.

Scarlet red in an ointment of from five to ten per cent. strength is an excellent remedy when epithelial growth is slow. Unhealthy granulations are cleansed thoroughly with hydrogen peroxide and then bathed in boric acid solution, and the nitrate of silver stick may be used where needed. The surrounding healthy skin to within one centimeter of the granulating area is covered with a bland oinment to prevent unnecessary irritation, and then the scarlet red ointment may be applied in a very thin layer over the entire surface, or spread thinly over strips of gauze and these laid over the raw surface. However, we usually merely apply the ointment to the margins of the wound. It is left on for from twenty-four to forty-eight hours, and then the wound is treated with a bland ointment for the same length of time, and the scarlet red is repeated as necessary. Occasionally it is employed in a strength as high as twenty per cent., but this is too strong for general use. It should not be applied until the irritation has subsided and a granulating surface is presented.

Frequent examinations of the urine should be made in all cases of extensive or severe burns. Acute parenchymatous nephritis is a frequent complication, as its also congestion of the respiratory and digestive tracts and the nervous system. There are many theories as to the toxic phenomena accompanying burns—hemolytic changes in the blood with the formation and absorption of cell poison, hematoxin, Pfeiffer's theory based on the cumulative action of peptones, and Kutcher's theory that methyl guanidin is the toxic agent are some of the explanations offered of the profound systemic depression often encountered. Capillary emboli, thrombi and infarcts, especially in the kidneys, have frequently been found at the autopsies of fatal cases. It is doubtless true that these toxic phenomena are occasionally incident to sepsis, but aseptic intoxication must be much more frequent. Tschmarke,

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Schöne and other observers have argued that in some way the burned tissues elaborate a toxin, which in many instances is fatal; hence they have urged the prompt removal by vigorous scrubbing in second degree burns and by a sharp knife in those of the third degree of all tissues that have been damaged beyond repair. Friedrich urged this radical removal within six hours of the occurrence of the burn for the reason that any infection present within the tissues would not be taken up by the general circulation within that time. He also believes that possibly the adjacent living tissues co-operate with the burned ones in the generation of the toxic products.

Whatever may be the cause, the clinical fact remains that a person suffering from a severe, or sometimes even a mild burn, may be getting along nicely, and we may feel confident that no toxic symptoms will be encountered, when the patient suddenly becomes profoundly ill, the temperature drops, and then convulsions, delirium and death result. The tendency now is to explain these late phenomena as a condition of anaphylaxis induced by absorption of substances from the burned tissues which act like an antigen. After a while the body becomes sensitized and further absorption is followed by anaphylaxis phenomena. Heyde has reported a number of such cases in which no post mortem explanation for death could be found, and most of these patients did well for twelve to fifteen days and then suddenly succumbed. He declares that similar phenomena can be produced in animals at will by inflicting a small burn, or re-implanting some of their own tissues incinerated outside. Vogt believes that tissue albumins under the action of heat take on antigenic properties, so that anti-substances are developed, which in turn by acting on the antigenic substances give rise to anaphylatoxic products and the symptoms of anaphylaxis. Atropin and adrenalin hypodermically are the most dependable remedies.

It is advisable in all burns of wide extent or at all severe to keep the bowels well open, and for this purpose nothing is better than citrate of magnesia. The kidneys should be kept active with potassium citrate, 20 grains every four hours, but more important than this is an abundance of drinking water, milk, or lemonade, and the diet should consist of concentrated and easily digestible foods. The skin should be kept clean and active, and if there be any sign of intoxication, the patient should be put in a hot pack and allowed to perspire freely for twenty minutes once or twice a day, and then kept warm by the application of hot water bottles about the body and a warm room temperature. Immersing the patient for half an hour in normal saline or bicarbonate of soda baths will gradually supplant the hot pack as the condition improves.

Curling's ulcer is usually prevented by a light diet consisting chiefly of liquids, and when this condition is threatened, the usual treatment for duodenal ulcer is indicated.

Conclusions.—The use of carron oil, even if some antiseptic agent be added, should be abandoned.

Ichthyol and boric acid ointments represent the best to be had in this kind of application, but all ointments are objectionable.

Picric acid in a saturated aqueous solution, sterile normal saline and sterile solution of bicarbonate of soda are the best liquid applications for burns.

The open air treatment is to be preferred for burns of all degrees when its proper use is practicable.

Scarlet red ointment is a dependable remedy to stimulate epithelial proliferation.

While we do not really know the etiology of the early or late toxic phenomena, clinical experience has demonstrated the value of the eliminative treatment and the importance of keeping the skin, kidneys and bowels in the best possible condition.

My own experience teaches me that many women have disturbances of menstruation which are often taken for physiological rather than for pathological conditions. The vast majority of women lose too much rather than too little blood at the period, and this excessive depletion is regarded as a normal rather than abnormal flow. The patient and her physician often assume that an excessive loss of blood is a transient or temporary irregularity or a personal habit which does not call for interference.—Dr. T. A. Ashby (*Old Domin. Jour. Med. and Surg.*, July, 1915.)

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Editorial Department

NEW YORK, AUGUST, 1915

ANIMAL CHARCOAL AS A WOUND DRESSING.

There was a time when charcoal was a popular or, as one author terms it, a fashionable remedy for foul and malodorous wounds and ulcers; but that was long ago—before the introduction of antisepsis. At present a renascence of charcoal as a wound dressing is taking place in Germany, a specially prepared carbo animalis of high degree of purity and fine consistence being employed. From the celebrated clinic of von Eislesberg, of Vienna, excellent results are reported from its use in the treatment of suppurating wounds by Dr. E. von Knaffl-Lenz (*Münch. med. Wochenschrift*, No. 18, 1915). The method of application is as follows: After irrigation of the wound with hydrogen peroxide and gentle wiping with sterile gauze the charcoal is insufflated with an ordinary powder blower until the surface assumes an intense black color, and a dry dressing is then applied. At the daily change of dressings the powder is washed off with peroxide, any particles adhering to necrotic areas being easily removed with forceps when the sloughs become loosened. This treatment proved remarkably successful in all cases of recently infected wounds. In the course of a few days the destruction of tissues was arrested, the wound surfaces appeared clean and were covered with healthy vascular granulations, and cicatrization rapidly advanced from the margins. Although in cases in which suppuration had been present for many weeks the results were less satisfactory, even here the period of healing was considerably reduced. As might be expected, this treatment is best adapted for broad or widely gaping wounds, but the finely pulverized charcoal in form of a suspension may be applied even to deep and penetrating wounds or cavities. Thus among the thirty cases reported there is one of long standing pyothorax, in which, though rib resection had failed to arrest the marked suppuration, the discharge was greatly reduced in a few days by the introduction of finely suspended charcoal into the pleural cavity. Attention is further called to the value of this agent as a dressing for unhealthy amputation stumps and bedsores. One of the great advantages of carbo animalis is its absolute harm-

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lessness. While it does not exert any direct effect upon bacteria, it seems to act by promoting oxidation of putrefying material, absorbing and neutralizing toxins, and drawing micro-organisms to the surface. Laboratory experiments have shown that the proteolytic ferment produced by pyocyaneus (pyocyanase) is completely absorbed by charcoal and thus prevented from manifesting its destructive action. To be sure, carbo animalis makes a nasty mess, but if it will do all that is claimed for it we may easily condone this objectionable feature.

HELIOTHERAPY IN SURGERY.

The use of sunlight in the treatment of disease is as old as the history of medicine, but it is only within recent years that heliotherapy has been placed upon a scientific basis. The physicist has shown that the solar radiations are a veritable storehouse of varied energies, containing, besides light, heat and actinic or chemical rays, such other forces as electricity, X- and N-rays. How and to what extent these different forces are concerned in the cure of disease is largely a matter of conjecture. To the practical clinician, however, the results achieved with any method of treatment count for far more than any amount of theory as to its manner of action. Looked at from the surgical viewpoint, there is abundant and undeniable evidence as to the value of sunlight in tuberculous affections of the joints and lymphatic glands. No one can fail to be impressed by the reports of Rollier, who has had an extensive and remarkably successful experience with heliotherapy in this field. Although it has been claimed that the best results are to be obtained at high altitudes, on account of the larger proportion of actinic rays present in sunlight, very favorable observations have been made at low levels, especially at the seashore. In fact, it would seem that the combination of sea air and sunshine is more beneficial in some cases of surgical tuberculosis than treatment at higher altitudes.

One of the newer developments of heliotherapy is in the treatment of unhealthy wounds, and the present European war is affording an excellent opportunity for testing its merits. This method has been especially investigated by French surgeons, to whom, indeed, we are indebted for much of our knowledge of the surgical uses of sunlight in general. Professor Poncet has demonstrated the value of heliotherapy, particularly at the seaside, in the treatment of wounds received on the battlefield, and the Riviera has proved a very suitable place for this purpose. Dr. R. Sorel, who is connected with a hospital in Monte Carlo, has carefully investigated this method and recently reported his results to the Paris Academy of Sciences. Aside from the use of aseptic precautions, he depends solely upon sunlight for the healing of wounds. Judging from the excellent results obtained in a variety of severe injuries of the hands and feet, legs, arms and shoulders due to bullets or fragments of shells, even when infection had set in, heliotherapy is to be considered as an efficient auxiliary in traumatic surgery. Sorel's observations are of especial interest since they confirm the favorable experiences previously made by Bernhardt, Bloch and others.

GYNECOLOGICAL HINTS.

By RALPH WALDO, M.D., New York.

A vaginal douche is used for three purposes:

1. To remove material by mechanical action, as blood clots. For this indication the temperature should be between 80° and 90° F. Plain sterile water or saline should be used. As a rule the latter is better, for it will not irritate. A simple way to prepare saline for this purpose is to dissolve a heaping teaspoonful of common kitchen salt in two quarts of water. It is well to specify kitchen salt, for the salt ordinarily used at the table contains starch, which is added to make the salt less hydroscopic.

2. To apply heat or cold for its effects upon the bloodvessels. A hot douche should never be less than 110° or more than 120°. It should be given with a nozzle that allows the free flow of water. At least one gallon should be used and frequently much more at a time. As the deep structures tolerate hot water better than the external parts, the latter, if unduly sensitive, should be thoroughly anointed with cold cream. It is best to use saline. This variety of douche should always be given with the patient on her back and with her clothing thoroughly loosened. A douche pan should be employed, with the hips slightly raised, or the patient may lie on her back in a bath tub. She should remain in the recumbent position at least one hour after taking a hot douche. If only one is taken during twenty-four hours this should be done just before going to bed.

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A cold douche is seldom used, for it has been found that the indications are met by the hot douche and with less liability of injury.

3. A medicated douche is employed for the purpose of applying various remedies to the vaginal mucous membrane and incidentally of washing away secretions that may have accumulated. Solutions of alum, copper, sulphate of zinc, tannic acid, etc., are commonly used. In a general way two quarts are sufficient. This douche may be given in a prone or sitting posture. It is seldom, however, that it will accomplish any more than a plain saline douche. The antiseptic is too weak and will not penetrate the mucous membrane. In fact, any antiseptic, strong enough to kill germs in the glands of any mucous membrane, will destroy the membrane and do much more harm than good. I have seen a severe vaginitis caused by a douche of carbolic acid.

Department of Railway Surgery

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THE STATUS OF THE SOUTHERN RAILWAY SURGEON.*

(PRESIDENT'S ADDRESS.)

By H. T. Bahnson, M.D., Winston-Salem, N. C.

Among the foremost factors in rebuilding and developing our Southland must be reckoned the Southern Railway. Out of the desolation of war and the chaos of misnamed reconstruction there emerged a few scattered railroad units so despoiled of rolling stock and equipment that they amounted to little more than mere rights-of-way. The ground remained only because it could not be sold or stolen.

Did time allow it would be interesting, and profitable as well, to detail the railroad history of the last half century and tell how one after another of these isolated units was toilsomely rescued from the hands of the spoiler and finally amalgamated into the great Southern Railway system of to-day.

Like an army, it has overrun the southeast territory of the United States, and its steel bands connect the great father of waters to the Atlantic Ocean and the Gulf of Mexico to the valleys of the Potomac and the Ohio. But it is no hostile army, come to conquer and despoil. Ever increasing its activities and strengthening its bonds, by the development of the resources of the country it has invaded, it brings to the inhabitants prosperity and makes life more worth living. Its watchword is "Peace" and its countersign "Progress."

But progress demands sacrifice no less than war. Every project worth while exacts its toll in human lives and suffering.

During the year ending June 30, 1914, on all the railroads of the United States 10,302 persons were killed and 192,662 injured, making a total of 202,924 casualties. Of the killed 265 were passengers, 3,259 employees, and 6,678 trespassers and outsiders. Fifteen thousand one hundred and twenty-one passengers, 165,212 employees, and 12,329 trespassers were injured.

During the same period on the lines of the Southern Railway eight passengers, eighty-four employees, and one hundred and fifty-seven trespassers were killed. Serious injuries occurred to thirteen hundred and seventy-four employees, seven hundred and five passengers, and four hundred and seventy-six trespassers. Ten employees and ten trespassers lost an arm or a leg. Three thousand four hundred and two employees, ninety passengers, and seventy-five trespassers suffered minor injuries, making a total of 6,372 casualties.

To minimize this deplorable but apparently unavoidable sacrifice is the duty and the privilege of the railway surgeon, and this brings me to the subject of my address,

The Status of the Southern Railway Surgeon.

What I have to say is largely reminiscent, and therefore partakes of the personal narrative. I shall not attempt historical accuracy, and I wish it understood that the opinions I express are those of only one man—worth that much and no more.

Like the organization he serves, the Southern Railway surgeon is a product of evolution. Although I was appointed in 1901, I have a record of services rendered as far back as 1875. One of my first cases is worth recording as a contrast to present conditions. A colored section-hand was run over by the work train, and his knee-joint crushed into pulp. An engine without headlight and running backward carried me through the darkness to the scene of accident, eleven miles away. It was before the days of "Safety First," and we bumped

* Read at twentieth annual meeting of Association of Surgeons of Southern Railway, Asheville, N. C., June 2-4, 1915.

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and swayed over those eleven miles in seventeen minutes, including start and stop. I had no one to help me—could not even persuade one of the bystanders to hold the man's leg. My operating table was a plank laid on piles of cross-ties; my light was a conductor's lantern, and I had to give the anesthetic (chloroform) myself. The only way to hold the limb in position to amputate through the thigh was to hang the mangled leg over my shoulder, which was protected by some old sacking. The injured man recovered.

During the long, lean years through which our Southland struggled for rehabilitation the railway surgeon shared the vicissitudes and uncertainties attendant upon the frequent changes in the ownership of the road which employed him.

During the ten years prior to 1896, under the management of the Richmond & Danville R. R. Co., our beloved and revered associate, Dr. George Ross, brought order out of chaos, and inaugurated a system similar to the one now prevailing. Before he could complete his organization and prove its efficiency the road again fell on evil days and its control passed into other hands. Much of his good work, however, remains to this day.

It is amusing, but intensely pathetic, to realize how little regard was paid in those days to the character and qualifications of the railway surgeon. Favoritism dictated his appointment, and his selection was generally a perquisite of the local attorney. One railroad lawyer's estimate of a railway surgeon is well illustrated by the following, which occurred at the time when the company was fighting nearly every claim for damages in the courts:

A very dear friend of mine was appointed local surgeon by the Assistant General Manager, W. H. Green, who then exercised the function of Chief Surgeon. The local counsel had chosen another man for the position and went post haste to Washington to remonstrate against this infringement of his prerogative. The big colonel listened calmly to his tirade and then asked these questions: "Do you consider your man as good a surgeon as mine?" The lawyer answered "No." "What is your objection to mine?" "Well, I promised the place to my man, and then yours wouldn't say what I want him to say on the witness stand." Colonel Green stopped further parley. "Don't say another word. This company wants surgeons that a jury will believe. My appointment stands."

Just here I want to say a word for the railway lawyers. It has been my fortune to be called to testify in many trials, and only in railroad cases has counsel failed to try to coach me before the case was called. Some may say this is due to indifference because their pay is assured in any event; but I prefer to believe they are actuated and upheld by the railway company in seeking only a just verdict.

The railway company rightly demands our best service, but makes no claim on our conscience.

In those days we had some queer specimens among the railway surgeons. I was detained by a delayed train and the local surgeon asked me to help him in an amputation. The injured man had been run over by a train and was horribly mangled. He was practically unconscious and evidently past help. The doctor commenced preparations to operate in spite of my protests. "Why," said he, "of course he'll die any way, but he'll never know the difference, and if I don't cut off his thigh, I can claim pay only for a first visit." The doctor has gone to his reward, and I shall not impair the good name he left to his family and friends by revealing his identity.

There are black sheep in every large flock, and I shall not attempt to deny that there may be a few in our Association who are deficient or warped in mentality and morals, but I claim with pride that the personnel of this body is as nearly ideal as can be attained by the independent judgment and careful selection of an efficient Chief Surgeon. He has justly fixed a high standard, but he expects no miracles, and with him competency and good judgment will ever outweigh erratic genius.

At the date of our last meeting the surgeons and oculists of the Southern Railway system numbered 467 and the employees on the pay roll 38,865. To the casual observer, the surgical staff may seem disproportionately large unless regard is paid to the millions of passengers transported over the road, for whose safety it assumes responsibility. A difficult problem is presented in the case of trespassers whose carelessness and disregard for the property rights of the railroad company greatly augment the list of casualties. It is an inexplicable paradox that lawmakers, who demand most rigid precautions in every other line of safety, should give practical encouragement to the dangerous practice of using railroad bridges and tracks as a public thoroughfare. An exodus of demagogues and shyster law-

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yers must occur before we shall attain the civilization of Europe and penalize the trespasser.

Only those of us who have been long in the service can fully appreciate the humane consideration the company now gives to the victims of this culpable negligence. Before the appointment of our present Chief Surgeon, trespassers had a poor show at the hands of the Company. At best, the surgeon was instructed to render the necessary first aid and turn the victim over to his friends. But only in rare instances was he blessed with friends who could or would undertake to care for him, and naturally the town and county authorities were loath to assume the burden. On one occasion this objection was cleverly overcome:

A tramp was run down by the train and his leg so mangled as to require amputation. The railway surgeon did his work in the shed of a lumber yard and then found no place to put his patient. The town had no hospital and the lock-up was manifestly unsuitable, so he appealed to the chairman of the county commissioners to admit the man into the well-equipped hospital ward of the County Home. Of course the chairman thought that the railroad should be responsible for those injured in its operation, and flatly refused the request. However, it so happened that only a short time before an interloper, disregarding the "No Admittance" sign upon the door, had wandered into a factory and tumbled down an open elevator shaft with direful results to his anatomy. When reminded that he had sent this man to the County Home, the chairman could raise no further objection, and within a week admitted a similar case for the surgeon without a protest.

The question of compensation is of vital interest to us all. Some of the roads in our territory pay no fees to their surgeons, who apparently are willing to exchange their services for pass privileges. A friend of mine who is agent in a city where one of these roads has three surgeons, told me a short time ago that he nearly always had to send for an outside physician, because his accident cases could not wait upon the dilatory response of their surgeons. Such a condition savors rather of parsimony than true economy. As I understand it, the policy of our Company is opposed to the appointment of a large staff in any given area, but there is a tacit understanding that its surgeon will supply an acceptable substitute in case of absence or unavoidable detention.

Approximately $75,000 is paid each year by the Southern Railway for the immediate care of its injured. This includes more than $18,000 for hospital attention and nearly $15,500 for outside surgeons, ambulance bills, x-ray examinations, burial expenses, and miscellaneous items. Deducting fees for physical and optical examinations, which are repaid by the employees, and excluding salaries, we find that the cost to the Company for surgical attendance proper will average less than $5 for each injured person, and less than $1 per capita of its employees. Certainly such compensation will not impoverish the Company, nor will any of its surgeons be burdened with wealth.

If literally construed, our fee bill may work an unintentional hardship, as shown by an experience of mine many years ago:

A colored passenger on an overcrowded excursion train was pushed or thrown off the car platform, and wrapped around a signal post. He lost several teeth, his jaw was dislocated, there was a double fracture of the left humerus and compound comminuted fractures of the right humerus and both bones of both legs. The right leg especially was badly lacerated and it appeared impossible to save it. I spent about two hours each day for three weeks in dressing the wounds and readjusting the bones which, in spite of all I could do, the man would misplace by his restlessness. My bill amounted to $33.50 and $14.00 for bandages, dressings and apparatus I was compelled to buy. The Superintendent deducted this $14.00 from my voucher on the plea that treatment of fractures implied the furnishing of permanent dressings. To make a layman understand the difference between a simple and compound fracture, such as this case presented, seemed a hopeless task and I did not attempt it. Conservatism is my ideal of surgery, and the sight of a cripple whom I have maimed gives me a nightmare even in the daytime. When, therefore, four months later this man walked into my office and told me he was making good wages as a tobacco roller, I was measurably consoled for the niggardliness of my fee, and might have remained contented if my curiosity had not got the better of me. But when he told me that he had followed my advice to go himself to the Superin-

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tendent without consulting a lawyer and that he got $250.00 for his injuries, I felt badly again, and have often since, because I think the Company owed me more than $19.50 for saving them the payment of thousands. However, such an experience gives a spice to life, and it has not changed my estimate of conservatism.

Our opportunities in this direction are wonderful and compare well with what we read daily of military surgery. We have to deal with men in the prime of strength and vitality; we get to them almost immediately after they are injured, and the simple technic with iodin and alcohol and hypertonic salt solution does away with the dangers of sepsis. The recuperative power of even badly mangled tissues under such circumstances is simply marvelous. That we believe in and practice conservatism is proven by the fact that in 1913-14 only 10 employees and 10 trespassers lost a limb, whereas 47 employees and 28 trespassers suffered this calamity during the previous year. To save a limb is a task far more difficult than to cut it off, and I wish it were possible to secure a just recognition of this fact in our schedule of fees. At present there seems to be a premium offered for an amputation, which we know is the least desired result of an accident. An empty sleeve or a pair of crutches is a stronger appeal to the jury in a suit for damages than can be made by the most eloquent contingent-fee lawyer.

To be sure many things connected with our work are not entirely to our liking. We have our special trials and disappointments, but they are largely compensated for by the satisfaction of work well done in the saving of life and limb, and let us never forget that we are envied by our less fortunate brethren. If anyone of us is dissatisfied with his position, I would advise him to learn from our Chief Surgeon how many applications have been filed by his best friends and without his knowledge to relieve him from his unpleasant duties.

Not the least of our compensations is the pleasure of these yearly gatherings to renew acquaintances and cement friendships amongst our widely separated membership.

I beg to thank you again for your kindness in selecting me to preside over this meeting, and also for your courtesy in giving ear to my rambling address.

With the co-operation of our efficient Secretary a long-felt desire of mine has been attained, and we present for your consideration an interesting program, dealing with subjects wholly germane to and connected with railway surgery.

CHOICE OF ANESTHETICS.*

By T. E. ABERNATHY, M.D., Chattanooga, Tenn.

It is not my intention in this brief paper to discuss the merits or demerits of the many new drugs that are being tried out in the field of anesthesia, but to mention those in most common use and which are more or less familiar to us all. Neither will I take up the local anesthetics as such, but those to be employed in general inhalation anesthesia, only. In presenting this paper I make no claim for anything new or original.

In selecting an anesthetic the matter of paramount importance is the safety of the patient, and next, the successful completion of the operation. Except in cases where an immediate operation is demanded, the patient should be thoroughly examined, both as to present physical condition and personal history and habits. It is only by such examination that we can have any definite idea of the most suitable anesthetic in the individual case.

We should be especially careful in the examination of children and look for signs of lymphatism. It might be well here to give Gwathmey's diagnosis of this condition:

"The majority of writers are agreed that a positive diagnosis of this condition during life is very difficult. The fact is that enlarged tonsils and the condition termed status lymphaticus by most writers call for the extirpation of the tonsils with the idea of increasing oxygen in the tissues and the blood and stimulating the growth of the individual. Connor says: 'The plainest signs of congenital hyperplasia of the vascular system is the noticeably small size and thin walls of all arteries.' Pasty complexions, a large amount of subcutaneous fat, and, in adults, a scant amount of axillary or pubic hair are usual; also the hair of the head has a peculiar dry, brittle character. Enlargement of the faucial, pharyngeal and

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laryngeal tonsils is frequently present. The diagnosis of a tumor running under the sternum would be almost pathognomonic of this condition. Cocks considers the x-ray examination second only to the general condition of the patient in making a diagnosis.

"Most patients dying during or immediately after anesthesia have been young people or children, of flabby type, with enlarged adenoids, tonsils, thyroid (usually), and thymus, with narrow, high arched palate, small mouth and throat, and weak heart sounds. During anesthesia, grayness of complexion or pallor is witnessed, with weak heart action and shallow breathing. Enlargement of the thyroid is said to exist in more than fifty per cent. of cases. Enlargement of the tongue is an important factor in diagnosis. The spleen has been found to be greatly enlarged in many cases, also the mesenteric, popliteal, axillary, and inguinal glands. Exophthalmic goitre may also be present, in which event heart failure under the anesthetic is probable. Congenital defects, such as cleft palate and cleft kidney, are sometimes associated with status lymphaticus. All patients have a pale, thin skin, pasty complexion, and usually much subcutaneous fat. The glands of the neck are also sometimes enlarged.

"The above complex of symptoms is noted when, given chloroform for any length of time, much of the anesthetic is absorbed and less excreted than is usual, with a consequent continual poisoning of the system until death occurs several days after the anesthetic. Sometimes delayed chloroform poisoning is mistaken for status lymphaticus. In status lymphaticus, especially in children, patients seem to dread the anesthetic more than is usually the case. This fear would certainly add to the shock and decrease the normal resisting force of all the organs to the effects of the anesthetic. Two cases of death, noted by Wheelock of Fort Wayne, were due to cardiac failure and asphyxiation. In cardiac failure no premonitory symptoms are present, but in asphyxiation there is a disurbance of breathing at various times. An enlarged thymus has sometimes produced pressure from which asphyxial symptoms have developed. In some of the reported cases, death occurring during anesthesia always came suddenly, with pallor and dilated pupils. In some there were superficial respiration and intermittent pulse just before the last signs mentioned, together with cyanosis and dyspnea. Ohlmacher states that deaths from status lymphaticus are due to increased intracranial pressure, with sudden edema. Halstead points out the great danger of operating for adenoids and tonsils upon children with status lymphaticus, on account of the great shock which the added fright and violent struggling would bring on—in some cases enough to produce death.

"*Choice of the Anesthetic for Suspected Cases.*—From the study of a large number of statistics, the fact that choloroform is contraindicated can not be questioned. Roberts concludes that ether is the safest anesthetic for all of these cases. Unquestionably chloroform should be avoided in all suspected cases. Ether by the vapor or drop method should be the anesthetic of choice. No closed method should be used on account of the possibility of pressure symptoms. Children who sink into deep anesthesia quickly from small doses of the drug should at once be considered questionable cases for the anesthetist.

"*Indications and Contraindications of Ether.*—Hewitt states that in 'healthy and moderately healthy subjects the risk connected with the administration of ether is very slight, the reported fatalities having almost invariably taken place in exhausted or markedly diseased individuals.' With the modern methods of administration, and with the combinations and sequences which make it possible to adapt the anesthetic to the patient, the indications for ether almost parallel the indications for operation, except, of course, for very short surgical interventions. Ether is especially indicated to continue the narcosis in operations about the mouth or nose, such as excision of the tongue or lower jaw, where there is considerable shock. Ether by the vapor or drop method is indicated for adenoid and tonsil cases, and wherever the status lymphaticus is suspected. Wherever a deep anesthesia is desired, ether by the closed method is indicated, as for amputations, dislocations, genito-urinary operations, laparotomies, excision of the breast, amputation of the cervix, vaginal and supravaginal hysterectomy, and in all conditions of shock and collapse.

"*Contraindications.*—The first objection to any

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method of administration of ether is where the patient has suffered intensely from a previous administration of this drug and expresses a decided dislike for the odor and after effects. Such idiosyncrasies must be respected. Kocher states that respiratory disturbances and pathological changes in the respiratory organs, with dyspnea, are contraindications of prime importance. Ether, he holds, causes more suffering and more lasting damage to the respiratory organs than can be attributed to chloroform.

"In lung and kidney disease, bronchitis and emphysema, and in ophthalmic operations, patients do better with some other anesthetic than ether. In aneurism and atheroma ether is contraindicated. It is also contraindicated in acute attacks of asthma or bronchitis. In chronic bronchitis or asthma ether introduced cautiously and given by modern methods is perfectly safe. In any condition with high blood pressure ether is contraindicated. Mortimer states that ether should not as a rule be given to infants and young children in whom it excites much mucous secretion, which may embarrass breathing or lead to bronchitis. Elderly people do not usually take ether well, because of the degenerate state of the respiratory and circulatory systems. Heavy smokers and people whose mouths and throats are in an unhealthy state, who are likely to cough and secrete much mucus and to have enlargement of the tongue and upper air passages, are considered by Mortimer as unfavorable subjects for ether. Ether is contraindicated if an actual cautery, a lamp, or any kind of electrical spark is to be employed.

"Most writers state that ether is contraindicated in operations upon the brain, because of the desirability of having the field of operation as free from blood as possible. Many surgeons, however, prefer the drop, or vapor, method of ether in all operations upon the brain. Similarly, exophthalmic goiter is stated as contraindication, but many surgeons prefer ether by the open method for this operation."

Hare recommends that chloroform be used in hot climates, when free circulation of air increases the safety of the patient, and in cases of Bright's disease requiring an operation, owing to the fact that anesthesia may be obtained with such a small quantity of the drug that the kidneys are not irritated. It is also to be employed in cases of aneurism or atheroma of the bloodvessels, where the shock of an operation without an anesthetic would be a greater danger than its use; in children and adults who already have bronchitis, or who are known to bear ether badly; in brain surgery, where ether is apt to produce meningeal congestion by vomiting; in tracheotomy when the case is urgent and ether produces respiratory irritation, and in parturition.

Contraindications of Chloroform. It should not be used in cases of fatty heart or cardiac dilatation; in those with a known idiosyncrasy; in so-called lymphatic persons with overgrowth of lymphatic tissue, as for example, adenoids (in the latter it is particularly apt to cause sudden death), nor in valvular diseases of the heart with symptoms of weakness.

Gwathmey says: "Nitrous oxide with oxygen is easily the safest anesthetic known." It is almost impossible to kill normal animals with this combination. If they are asphyxiated and the mask is removed, the heart will continue to beat for several minutes. This gives sufficient time for the gas to escape as it reaches the lungs and for breathing to begin again automatically. Such is the case in the laboratory and in the operating room. The only likelihood of a mistake is when the physiological signs of asphyxiation are not known."

In conclusion I would say that every hospital should have a skilled anesthetist capable of giving any approved anesthetic by the best method. None but the purest drugs should be used. And when the times comes that the very best man available gives the anesthetic—and not just any one we can pick up for the occasion—then there will be fewer deaths on the operating table.

In railway surgery, owing to the emergencies so frequently arising and the fact that operations necessarily have to be performed under unfavorable surroundings, the choice must be made between ether and chloroform, but we should be careful to select the one most suited to the case in hand.

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REPORT OF AN INTERESTING CASE OF CONTUSED AND LACERATED WOUND, CAUSED BY A HAND-CAR.*

By J. R. CARROLL, M.D., Henderson, Tenn.

All cases, as they should be, are interesting to the surgeon from every viewpoint, when he considers his responsibility to the individual patient, to the company, and to himself. To the surgeon and physician all patients are very much alike.

On January 17, 1913, I was hastily called to attend William M., colored, a section-hand. The caller stated that he thought my visit would be useless, as the patient's head was split open and his brains were oozing out.

Reaching the section house, I elicited the following history from the foreman: He and five hands were working about five miles away when it began to rain too hard to continue the work; so they decided to come in as quickly as possible. Boarding the car, they were running about ten or twelve miles per hour; the negro section-hand, contrary to the rules, was pulling the lever, facing the opposite direction to which they were going. When, about one mile from home, his hands slipped off the lever and he fell backwards in front of the fast-moving car, which, passing entirely over his body, ran about fifty or sixty yeards before stopping.

The foreman stated that upon reaching the negro he found his head was lying partly upon the steel rail and that he felt certain that the car wheels had passed over his head, as the car made a lurch that almost threw him from his seat and appeared to be about to leave the track.

Carefully viewing the case, I found the following conditions to be present: Slight concussion, slight when compared to those very severe cases we often find; pulse 40 to 50 per minute; respiration slow; temperature below normal; extremities cold; unconsciousness of perhaps three hours' duration.

By applying external heat and giving hypodermics of strychnia and atropin, consciousness was restored, yet the man was dazed and had very little speech or motion, and he continued in this condition for almost a week.

Now as to the wounds and their treatment. The head wound extended from near the center of the forehead almost straight across, about two and one-half inches, up and back into the hair, making in all about six inches. The skin was forced back till it looked as if an attempt had been made to scalp him in true Indian style. There were no special marks or wounds on the feet or legs. My opinion is that the car struck him first in the gluteal region, for I found several contusions on both sides of the nates, and some in the lumbar and under both scapular regions. Careful examination showed no bone injuries. I carefully examined the periosteum over the area of the scalp wound and was perfectly satisfied that it was not injured in the least.

I thoroughly cleansed the wound and the entire head, using soap and water and a saturated solution of boracic acid, as strong antiseptics should never be used in scalp wounds. I shaved off the surrounding hair, trimmed the ragged tissues, brought the parts together, put in the stitches, using many interrupted ones, as many are needed in transverse scalp wounds to hold the parts together, and applied tincture of iodine to the sutured edges.

Cold compresses were applied over the contused wounds for the first few days with effective results, and I dressed the head wounds with powdered boracic acid, iodoform gauze, adhesive plaster, and bandages. I opened only one of the contused places to let out the effused blood and used dilute echinacea, alternating with diluted tincture of arnica after a few days, till it healed.

If the case had ended here, perhaps, I would never have thought of reporting it to this Association, but, while seemingly well, he continually complained of a general malaise or indescribably dull, stupid feeling. Repeated examinations failed to find marked symptoms of any special lesion, and I believed it to be the effect of concussion of the spine.

After three months I advised him to go to the farm and did not see him for a year. It is needless to state that in the meantime the railroad company settled with him after an officious and meddlesome attorney had leeched him out of a large percentage of his claim, for, being a trusted employee of the company for fifteen years, his claim had the recommendation and encouragement of the local officials and required no outside influence for its settlement.

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He resumed his former position with the company in the latter part of 1914, and the foreman reported to me that M. was not the hand he once was; he was forgetful, absent-minded, and physically weak. I had him come to my office and after a thorough examination found the foreman's report to be true.

The negro referred to the car injury as the beginning of his breakdown, but I assured him that the company had forever settled his claim and his hopes must turn from that point.

I could not diagnose the condition as neurasthenia, since there were none of the erratic symptoms so noticeable in such cases; it did not appear to be a case of traumatic hysteria. The negro's statements were not exaggerated, for I found them to be facts; hence I was forced to maintain my first diagnosis, concussion of the spine, the class or kind that is difficult to diagnose, and, as you know, manifests a chronic nervousness in keeping with the history of this case.

I have since had a specialist examine him and make a radiograph, but it did not show any bone lesions, displacement, or curvature. The specialist was inclined to the opinion that he had locomotor ataxia, while I still believe and contend that he is suffering from the effects of concussion of the spine.

Thus the case stands to-day.

ASSOCIATION OF SEABOARD AIR LINE RAILWAY SURGEONS.

The program of the fourteenth annual session of this Association reached us too late to permit of its complete publication. The meeting bids fair to be a great success, both from a scientific and social viewpoint. What with banquets, receptions, steamer trips and other entertainments the members, their families and guests are bound to have a most delightful time. Below we give a partial list of the papers to be presented:

"Autointoxication."—Surgeon L. C. Ruter, Madison, Fla. To open discussion, Surgeon E. H. Wyman, Estell, S. C.

"My Experience with an Individual Drinking Cup Vendor on a S. A. L. Train."—Surgeon B. G. Allen, Henderson, N. C. To open discussion, Surgeon S. T. Ross, Winder, Ga.

"The Causes of Cancer and Delayed Recoveries."—Surgeon H. D. Stewart, Monroe, N. C. To open discussion, Surgeon T. J. McArthur, Cordele, Ga.

"Fracture of Cervical Vertebrae."—Surgeon C. M. Strong, Charlotte, N. C. To open discussion, Surgeon Geo. Ben. Johnson, Richmond, Va.

"Resection of Clavicle."—Surgeon Oren Moore, Charlotte, N. C. To open discussion, Surgeon J. E. Rawls, Suffolk, Va.

"Traumatic Injuries of the Brain."—Surgeon E. P. Lacey, Bessemer, Ala. To open discussion, Surgeon T. H. Hancock, Atlanta, Ga.

"Treatment of Tetanus."—Surgeon L. S. Oppenheimer, Tampa, Fla. To open discussion, Surgeon R. B. Epting, Greenwood, S. C.

"Watermelon Seed in the Prepuce, and Report of a Few Interesting Cases."—Surgeon Samuel B. Little, Colbert, Ga. To open discussion, Surgeon J. E. Malone, Louisburg, N. C.

President's Address.—Surgeon M. L. Wood.

Address.—Mr. W. J. Harrahan, president of the S. A. L. Railway System.

Address.—Hon. W. L. Stanley, claim attorney.

Address.—Hon. W. L. Seddon, assistant to the president.

Address.—Hon. C. S. Lake, general superintendent.

Address.—Hon. Chas. R. Capp, vice-president.

Annual Address.—Chief Surgeon Joseph M. Burke.

"Traumatic Hernia."—Surgeon Frank L. Eskridge, Atlanta, Ga.

"Hernia."—Surgeon J. G. Dean, Dawson, Ga. To open discussion, Surgeon H. A. Burke, Petersburg, Va., and Surgeon W. J. Dismuke, Ocilla, Ga.

"Infantile Gastro-Intestinal Disorders."—Surgeon T. E. McBryde, Rockmart, Ga. To open discussion, Surgeon A. B. Crooms, Maxtoon, N. C.

Report of a Case.—Surgeon H. A. Burke, Petersburg, Va. To open discussion, Surgeon Southgate Leigh, Norfolk, Va.

Book Notice

Sexual Disorders in Men and Women. By William J. Robinson, M.D., New York. New York: Critic and Guide Co.

A thorough perusal of this book convinces one that the author has spent much time in the study and observation of cases suffering with sexual disorders. Too true it is, that sexual pathology, its causes and effects, are so little understood by the general practitioner. This work is exceedingly well written and to the point. The author does not believe in "beating about the bush;" a spade's a spade with him, as is clearly shown in the text. The case reports, typical and atypical, are numerous and should be carefully studied, as much good material is presented therein. Dr. Robinson shows that he is a past master in history taking which is a very important part of diagnostic technique. Specialists in sexology will agree with his statements in the main, but there will be some who naturally will take exception. This applies to the effects of masturbation, particularly in reference to tabes and insanity. The author takes special pains to point out that these sufferers from sexual disorders, both male and female, must be treated with the greatest consideration and patience. The confidence of the patient is of prime importance. Sexual disorders of the female are incorporated in this book which increases its value,

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as these conditions are much less understood than those occurring in the male. This book should appeal to the general practitioner especially, for it is to him that these cases make their first appeal for relief. It is shown that prolonged treatment must be instituted in many cases, and that much damage may be done the patient through carelessness and ignorance. Loss of confidence, as is shown by Dr. Robinson, plays a very important psychologic role, and if all hope is lost, it requires much ingenuity on the part of the physician to restore the patient to a proper line of thought. Diagnosis is emphasized on almost every page, and this is of great importance, for the scientific treatment depends upon the correct diagnosis. Each patient should be studied and treated individually. The work also points out that the treatment of many types of sexual disorders must be left in the hands of one who has had a wide experience, as frequently special treatment requiring dexterity and experience is necessary. The pathology of various sex disorders is not dwelt upon at all, or very superficially. Dr. Robinson weakens his book by this omission. The pathology is little understood, even by many sexologists. One with the knowledge of sexual disorders that Dr. Robinson has gained through his vast experience should be able to present this subject in a most scientific manner. A careful study of the pathologic changes which occur in the various sexual organs through diseases, if discussed in this book, would make exceedingly interesting and instructive reading.

Surgical Gleanings

Acute Intestinal Obstruction.—Dr. C. E. Tennant (*Colo. Medicine*, May, 1915) believes that to reduce the present high mortality attending acute bowel obstruction four important rules should ever be observed: First, the early recognition of the lesion even at the expense of an exploratory laparotomy; second, total abstinence from all purgatives, laxatives, and fluid ingesta which may hasten the rotation of the gut and its attendant circulatory embarrassment; third, frequent stomach lavage prior to and often after the operation; fourth, ever to bear in mind that unless absolutely indicated, the penalty for bowel resection at this time is a greatly increased hazard for the patient.

Oleum Rusci as a Substitute for Peru Balsam.—According to Dr. H. L. Heusner (*Münch. med. Wochensch.*, No. 52, 1914) oleum rusci is a satisfactory and cheap substitute for Peru balsam in the treatment of infected wounds and leg ulcers. Other kinds of tar oil proved too irritating. The oil was spread over the wound or ulcer in a thick layer after previous cleansing with peroxide. There was a speedy diminution of the discharge and granulations rapidly developed. Aside from slight burning in sensitive persons no discomfort was experienced. Superficial ulcers often healed after two applications.

Subcutaneous Rupture of the Clitoris.—A unique case of this kind is reported by Dr. E. Melchior (*Zentralbl. f. Gynaek.*, No. 7, 1915). The patient, a woman, aged fifty-seven, after a fall upon the anterior pelvic region, developed a tense, indistinctly fluctuating tumor over the right pubic area. It was of the size of a small fist, covered with intact skin, immovable, and projected into the labium. Although she gave a history of having suffered from a left inguinal hernia the hernial rings appeared patent. A diagnosis of hematoma was made and confirmed by incision. The cyst, which was encapsulated and contained black clotted blood, was found to be connected with the corpora cavernosa of the clitoris, which presented an almost complete solution of continuity. Separation of the cyst was accomplished with great difficulty and was attended with profuse hemorrhage. A search of the literature failed to reveal a similar case of hematoma from a ruptured clitoris.

Treatment of Gunshot Wounds of Joints.—Prof. H. von Haberer (*Münch. klin. Wochensch.*, No. 7, 1915) formulates the following rules in the treatment of gunshot wounds of joints: 1. In every case in which the bone or joint is injured a sterile dressing should be applied and the extremity kept at rest by appropriate splints. 2. If infection has occurred several small incisions should be made to provide free drainage of pus, gauze strips being avoided and rubber tubes solely employed. 3. Where the secretion is thick peroxide of hydrogen and formalin (1 to 4 per cent. solution) are most suitable irrigation fluids. 4. Complicating bone injury is a *noli me tangere*, and probing is to be avoided because it can only do harm. 5. In fractures with marked displacement extension is the best procedure, being associated with semi-flexion and suspension in the case of the lower extremities. 6. Secondary gravitating abscesses are to be incised at the deepest points. 7. By this course of procedure many extremities can be preserved and amputations reduced to a minimum. 8. Ankylosis is to be treated subsequently by orthopedic measures and occasionally by interposition of fascia. 9. Bullets are to be removed only when so situated as to cause disturbances.

Gunshot Wounds of Peripheral Nerves.—Professor Kirschner (*Deut. med. Wochenschr.*, March 11, 1915) states that not every nerve injury from a gunshot is followed by loss of function. The clinical signs, which, however, are not constant, comprise: (1) Motor paralysis of various degree; (2) sensory; (3) immediately or gradually developing, radiating pains; (4) vasomotor and trophoneurotic

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disturbances. The pathological changes found on operative exposure of the nerves are: 1. The nerve is embedded in cicatricial tissue. 2. An irritating foreign body is in contact with the nerve. 3. The nerve is completely or partially divided. 4. It shows a uniform or irregular thickening. 5. No lesion is found in spite of functional disturbances. In the presence of motor paralysis surgical intervention should not be resorted to until the lapse of six weeks. All pronounced cases of this kind which have not improved during this time or have grown worse require operation, and especially those other cases in which there is an increase of pain to the point of intolerance. Of the operative procedures the following come under consideration: (1) Nerve suture (if necessary after sufficient mobilization); (2) bridging over of the defect by foreign material; (3) neurolysis, enveloping the nerve with healthy tissue; this is always to be carried out after its complete exposure.

A Substitute for Tincture of Iodine.—When a fresh tincture of iodine is not available for wound disinfection, Dr. J. Schumacher (*Deut. med. Wochensch.*, No. 8, 1915) employs alcoholic solutions of potassium iodide and ammonium persulphate. The two following solutions are kept on hand: I. Potassium iodide 2.0, water and alcohol of each 5.0. II. Ammonium persulphate 2.0, water and alcohol of each 5.0. The wound is painted with the first solution by means of a cotton wrapped applicator and this is followed by application of the second solution. The two fluids are not to be mixed because a precipitate forms, and solutions more than a few weeks old are not to be used because they lose their efficiency.

Carcinoma of the Stomach. — Dr. John B. Deaver (*N. Y. Med. Jour.*, July 3, 1915), in an article entitled "What does surgery offer the patient with carcinoma of the stomach?" insists upon the necessity of early diagnosis. Less than one per cent. of the cases come to the surgeon and less than one-quarter are suitable for operation. There are no pathognomonic signs of cancer of the stomach in the operative stage and therefore surgical exploration is essential. This does not necessarily mean opening the abdomen alone, but the stomach as well, if a diagnosis cannot be made by inspecting and palpating the stomach wall. He does not consider absence of hydrochloric acid as of much diagnostic importance, but believes that the x-ray in the hands of an expert with a large experience in these cases is of great value in the early recognition of the disease. Negative x-ray findings, however, should not deter the surgeon from opening the abdomen, dispelling mystery, and revealing the truth. The combined statistics of the large clinics indicate that from 20 to 30 per cent. of all patients having undergone gastrectomy for carcinoma of the stomach will live more than three years after operation, and that from 10 to 20 per cent. will be alive at the expiration of the five-year period.

The Metabolic Theory of Cancer. — Dr. L. Duncan Bulkley (*Med. Record*, July 3, 1915), in "a plea for the rational treatment of cancer," states that malignant disease "has been found definitely to increase with the spread of modern so-called civilization along the lines of luxury and attending indolence." This has been observed especially in the over-consumption of meat, coffee, and alcohol, as proven by statistics." In his opinion cancer is a constitutional disorder, the product of which is the local tumor, this being formed in some particular locality which was unduly irritated, probably the site of an "embryonic rest." Imperfect metabolism, especially of nitrogenous matter, marked failure in intestinal elimination, derangement of the endocrinous glands are considered as associated with the production of malignant disease.

Diagnosis of Colon Cancer.—Dr. Joseph Burke (*N. Y. State Jour. of Med.*, July, 1915) concludes that: 1. Early diagnosis in colon cancer is the surest means to a surgical cure. 2. In cases of unexplained loss of weight and diminished muscular strength, with secondary anemia in any adult above forty years, particularly if gastro-intestinal symptoms are present, cancer of the colon should be carefully considered. 3. Where a tumor is present in any of the four corners of the abdomen colon cancer must be thought of. 4. When peritoneal friction sounds are heard over the tumor it speaks positively for its intraperitoneal origin. 5. In sudden profuse hemorrhage from the bowel the colon should be diligently investigated for cancer, particularly the sigmoid flexure. 6. When an adult complains of colicky pains in the abdomen, particularly when accompanied by disturbances of bowel function, colon cancer should be thought of as the probable cause. 7. In cases of suspected acute appendicitis in elderly people, cancer of the cecum must not be lost sight of in our diagnostic deliberations. 8. In all cases where there is the slightest suspicion of colonic derangement the x-ray should never be omitted in the examination. 9. In all cases of suspected cancer of the bowel, x-ray examination should always be made. The x-ray is the greatest aid modern science gives us in the differential diagnosis of colon cancer.

Surgical Treatment of Gastric Ulcer.—Dr. C. H. Frazier (*Penn. Med. Jour.*, May, 1915) remarks that of all the methods at our disposal in the diagnosis of ulcer he has come to place reliance chiefly upon the history and upon the roentgenogram. He advocates without reservation surgical intervention in chronic ulcer of the stomach and duodenum, because its effect is more enduring and satisfactory than that obtained by medical methods. The nearer the patient is to middle life the more urgent the need of operation, for fear of cancer. Gastrojejunostomy alone has left a trail of failures; gastrojejunostomy with exclusion and infolding of the ulcer is a distinct improvement. Transverse resection offers the greatest assurance of a complete and "enduring cure."

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Original Articles

NOTES ON THE TECHNIC OF TRANSFUSION.*

By LEO BUERGER, M.D., New York.

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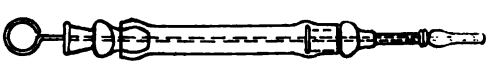
During the past four years we have witnessed the introduction and rejection of many methods of technic for transfusion of blood. First to attain popularity was the cannula of Crile with modifications by the author, Elsberg and others. For a time the suture method was in vogue because of imperfections in the construction of the cannulæ. Later, the syringe method advocated by Lindeman gained favor, and now again the use of chemical substances inhibiting coagulation seems to be attracting attention.

Although the surgical end-to-end arterio-venous coupling is practically always to be relied upon in experienced hands, we have found a modification of the syringe method so simple that it may not be amiss to describe our technic here.

Instead of the employment of sharp-pointed cannulæ that penetrate the vein by way of the skin, it has been found far better to expose both the veins of the donor and recipient by means of a small incision, about 1 cm. in length, not only to avoid dislodgment of the cannulæ, but also to be able to employ tubes of such large calibre that clotting will not take place. A similar method has doubtless been adopted by other surgeons, who have found the procedure of vein puncture not always dependable.**

Our cannulæ are ¾ inch in length, are provided with a bulbous enlargement about ½ inch from their end, with a corrugated or roughened portion just distal to the enlargement. (See Figure.) At this point the ligature fixing the cannula is to be placed. A short piece of tubing may be attached to the outlet of the cannula, and is in its turn provided with a coupling for a "Record" syringe. The rubber tube coupling is particularly recommended for use in the donor's vein. A mandrin obturates the cannula, its blunt end facilitating easy entry of the vein.

Technic. The recipient's vein is first exposed by a small incision, 1 cm. or slightly more in length, the distal end of the vein ligated with catgut, and the cannula inserted into the proximal end of the vein after incision into it, a ligature fastening the cannula in place. To facilitate exposure of the vein, a rubber tourniquet may be applied about the arm. An assistant may now slowly inject normal salt



Cannula with rubber tubing and extra coupling attached (The Kny-Scheerer Co.).

solution through the cannula in order to keep it patent.

The operator now exposes a good-sized vein in the arm of the donor, ligates the proximal end of the vein and inserts a cannula provided with a rubber coupling into the distal end, fastening it by a silk ligature. As soon as the obturator is removed, a copious flow of blood under fairly high pressure ought to be obtained. The escape of blood can be prevented by compressing the rubber coupling between the thumb and index finger. A "Record" syringe is at once applied, and if this is in good working order and if the venous pressure is sufficiently high, the blood will find its way of its own accord into the syringe, the piston being carried upward without the aid of the operator. When the syringe is full, it is passed to the assistant, who injects the blood into the recipient's vein, the escape

* Received for publication, March 18, 1915.

** Stetten of New York has used somewhat similar cannulæ.

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of blood during the time required for changing syringes being prevented by compression of the rubber coupling. In this way practically no blood is lost. The procedure can be carried out very rapidly—in fact, even more quickly than safety will permit. Indeed, it is often wise, after some ten 20 cc. syringes have been filled, to proceed more slowly, so that the donor may not suffer from too rapid loss of blood.

The advantages of the cannulæ and syringe method applied in this way are the following: First, the cannulæ are easily inserted and will not fail to remain *in situ* during the whole procedure. Second, clotting will not take place, because large tubes can be employed. Third, even an inexperienced person can act as assistant by injecting the blood into the recipient, the more experienced operator handling the donor. Fourth, loss of blood is prevented by the use of a short cannula with rubber coupling, and easy approach of the donor's vein to the syringe can be had by giving the rubber coupling a turn to one side or the other, as occasion may require. Fifth, the cannulæ will not fail even in inexperienced hands. When penetrating needles or cannulæ are employed, dislodgment from the lumen of the vein may easily occur, and even a proper entry is often an extremely difficult task.

BONE GRAFT FOR TUBERCULOSIS OF THE SPINE.

By JAMES C. WILSON, M.D., Hartford, Conn.

Hippocrates in his works about 500 B. C. made many references to the treatment of deformities. Of these the acquired deformity of the tuberculous spine was one of the more important, and he criticized the method of treatment which had been in vogue before that time.

It had been the custom up to that time to lay a patient suffering from a tuberculous spine upon a table or bench, employ extension and counter-extension, and apply a lever, one end of which was fixed and then passed over the kyphosis, while the surgeon put his weight upon the other end in order to reduce the deformity, the idea being that the deformity was the cause of the disability and not the result.

During the Middle Ages it was the custom to consider all cripples as objects of Divine wrath, and they were regarded as subjects of ill-omen and were treated with horror and disgust. Superstition withheld aid from these unfortunates and forbade even the mention of their existence, and it was customary to let them perish from want and neglect.

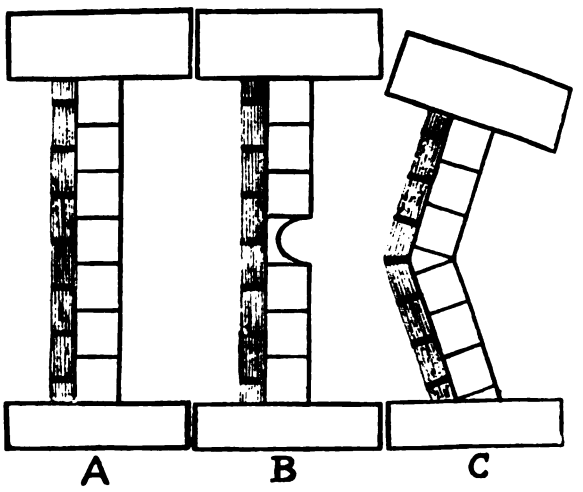


Fig. 1.

A. Showing a mechanical strut.
B. Strut softened on one side.
C. Result of softening of one side of the strut. Distance increased at angle.

In 1561 Ambroise Parè invented a steel corset in which the spine of a crooked person was laced.

In 1660 Glisson introduced suspension of the body for correction of spinal affections.

In 1779 Sir Percival Pott gave a very accurate description of the tuberculous spine, which he considered as a palsy of the lower limbs which is frequently found to accompany spinal curvature and is supposed to be caused by it and ascribed it to a

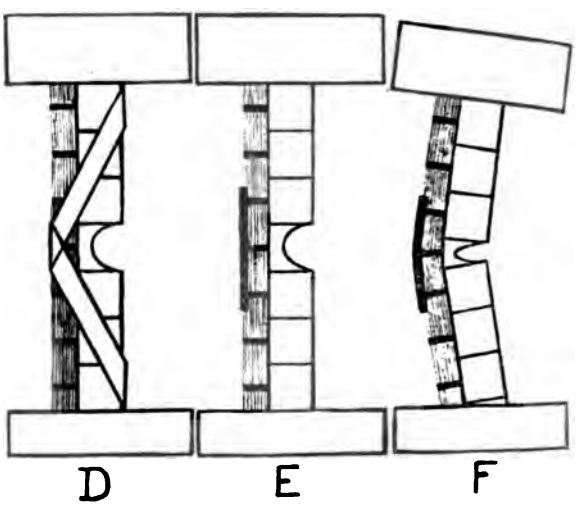


Fig. 2.

D. Method of fixation by pressure and counter-pressure.
E. Method of fixation by means of a stay to prevent separation at site of softening.
F. Same as "E."

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localization of unhealthy exudates. Its tuberculous nature was first pointed out by Delpech, Nelaton and the French investigators of the early 19th century.

All the more recent methods of treatment of this



Fig 3. Normal vertebræ.

condition have been confined to the immobilization of the intervertebral joints, and this for the reason that, whereas tuberculosis is for the most part a low grade inflammatory process in which repair



Fig. 4. Tuberculous vertebra.

starts nearly as soon as destruction and the progress of the case is dependent upon the ratio of these two conditions, rest is the most efficient means we have to diminish the destruction and increase the repair.

In the structure of the human body we have a weight resting upon a hard column which is composed of the vertebræ and cartilages called the

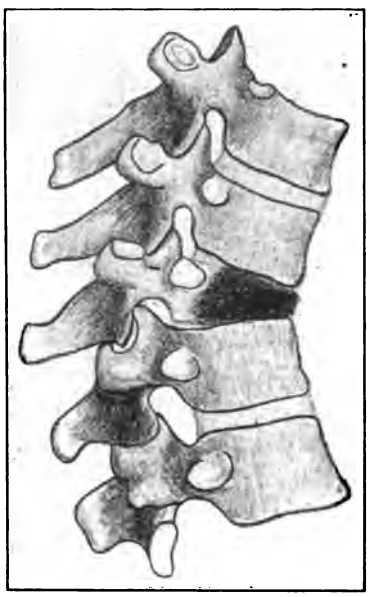


Fig. 5. Tuberculous vertebra crushed by compression, with resulting kyphosis.

spine, and which in mechanical engineering would be called a strut, and the weight resting upon it, compression. Applied mechanics tells us that if a

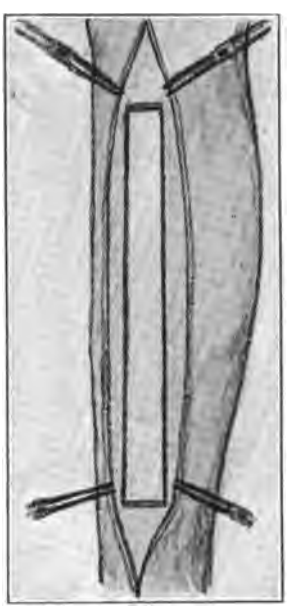


Fig. 6. Outline of the graft.

strut is softened on one side, the soft side will yield and the strut will bend.

In the spine, normally, there is a certain amount

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of bend due to the elasticity of the cartilages and the sliding motion on the articular facets, but this bend is easily controlled by the muscular and ligamentous balance.

In tuberculosis of the spine we have a focus in



Fig. 7.
Graft showing scarfing.

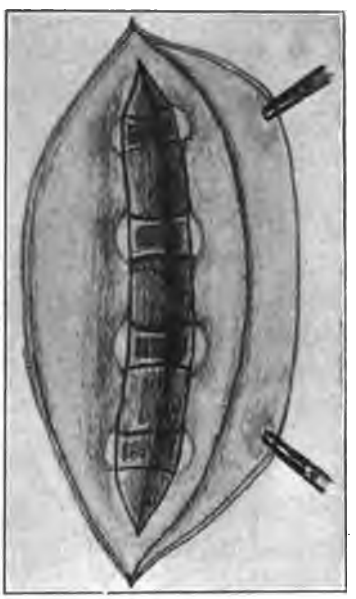


Fig. 8.
Showing incision through spinous processes.

the body of the vertebra, starting in the spongy portion and always tending to softening and disintegration of the vertebral body which forms one side of the strut, and as the compression crushes

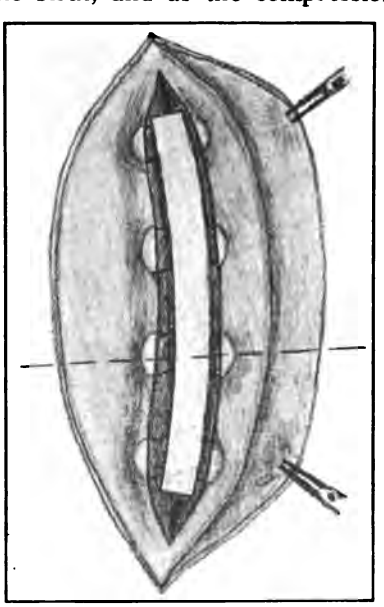


Fig. 9. Graft in position.

this side, the strut is bound to bend, resulting in kyphosis.

In the strut which has become softened on one side there are two ways to prevent bending, for as we have an axis at the facets upon which the vertebræ move, due to the compression of the superimposed weight on the softened or body side of the vertebra or strut, the posterior side of this axis must be under tension. The tension may be relieved by supplying a stay which will be able to withstand its force, or this condition may be supported by means of a plaster jacket which gives pressure over the point of the bend with counter-pressure over the thorax, lower abdomen and pelvis. This means that we have shifted the compression load back to the facets, which act as a fulcrum, and the superimposed weight is carried upon a lever composed of the healthy vertebra immediately above the diseased location.

With the plaster jacket the treatment was bound

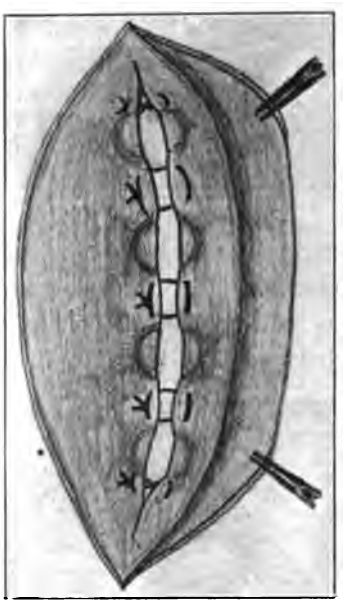


Fig. 10. Graft in place showing position of kangaroo tendon sutures.

to extend over a protracted period, and in spite of everything that we could do most cases went on to marked deformity with its consequent disability. This was because it is impossible for us to fix the spine with an outside appliance, to be worn by the patient, so as to entirely eliminate the motion in these joints.

Four years ago Albee described the use of a bone graft taken from the tibia and implanted into the spinous processes in the affected area to act as a stay, and this seems to fulfill all the indications of treatment in these cases to a remarkable degree. It not only serves as a stay to prevent the compression of the softened body of the vertebra, but it

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also prevents any rotation in the area in which it is situated.

The operation consists of the removal of a graft of the internal aspect of the tibia, extending through into the marrow of the bone. The graft should be ¼ to ⅜ inch wide and long enough to include one healthy vertebra above the affected area and one below. Albee removes this graft by means of a motor saw adapted for this purpose.

After making the skin incision to the periosteum, two parallel incisions are made through it to the bone, corresponding to the width of the graft desired. In some cases the periosteum is very easily detached, and even though it is, the bone when transplanted seems to grow perfectly well. Indeed, it is doubtful if there is any important function for

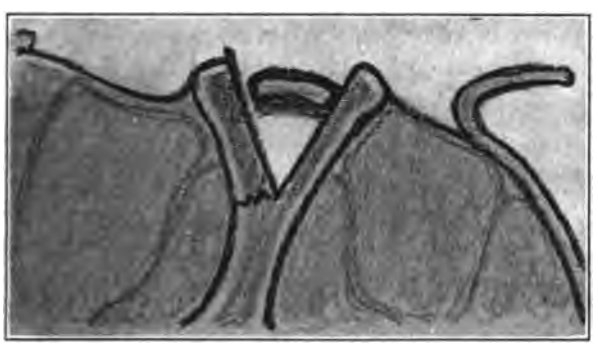


Fig. 11. Cross section of graft and spinous process.

the tissue which we have called the periosteum to perform.

It was believed, and is now claimed by a great many men, that this tissue is important in bone regeneration; but it is my opinion, from the work that I have done in these cases, that the value of the periosteum is more due to the bone cells which may be left attached to the membrane after it is scraped from the bone with a sharp instrument, and to its formation of a tube or canal through which the new bone may form, than to any power of the periosteal cells to produce osseous tissue.

If the periosteum is adherent, it as well as the bone and marrow which may adhere to the graft, when removed, is transplanted *in toto* to the spinous processes.

As soon as a graft in the tibia is loosened up so that it can be taken from its bed, a semi-elliptical incision is made from about an inch above the upper spinous processes to be ingrafted to about an inch below the lower ones, and the skin is dissected back to expose the tips of all the spinous processes within this section. These are then split either with an osteotome or with a heavy cartilage knife nearly to their base, and the ligaments between them are split in the direction of the bone incision. Great care must be taken not to separate the posterior spinal ligaments from the spinous processes, both on account of the nutrition of the broken fragments and the necessity of holding the bone in that position by suturing through the ligaments.

The bone graft is then lifted out of its bed in the tibia, and if too stiff to be easily bent to conform to the line of the kyphosis, it may be necessary to scarf the graft on the under or marrow side so that it may bend to come in contact with all the spinous processes. The graft having been fitted into its new bed, is then to be held in place by medium or large-sized kangaroo tendon mattress sutures placed through the ligaments as near the separated portion of the spinous processes as possible and over the graft. This done, the ligaments are further brought together over the graft by No. 2 chromic catgut, and the skin incision closed with silk-worm gut. The incision in the leg is brought together with silk-worm gut and dry dressings applied. The patient is to be kept in a prone position for a period of four weeks, as that is the time we know bone tissue normally to heal.

In this operation the bone graft may be cut out with Albee's motor saw, a semi-elliptical saw, or an osteotome. In a well equipped hospital a motor saw is to be preferred, as it works much more quickly and is believed to cause less shock. I, myself, have used the old-fashioned, semi-elliptical plaster saw, and find it to be very efficient, without the necessity of the cooling solution which must be used with a rapidly moving motor saw, and although the operation is somewhat lengthened, I have seen practically no shock in these cases.

The osteotome method of loosening up the graft is to be condemned for two reasons: First, it very materially increases the shock, and second, the graft is usually broken into several fragments. And although a break in the graft is not necessarily a serious accident as far as the final result is concerned, especially if the two fragments come in close apposition, I still always feel safer if this does not occur.

Case 1. R. W. Operation, November 5, 1913.

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A girl eight years old had had Pott's disease since she was four, and often took the characteristic attitude, when standing, of the hand on knee, or would lie across a chair or bed to rest herself quite frequently. She had been in a plaster jacket almost continuously since the beginning of the disease. High dorsal deformity was marked. A bone graft was removed from the right tibia with the old-fashioned semi-elliptical plaster saw, six vertebræ being included in the graft. Uneventful recovery, and now at the end of nearly a year and a half she appears, aside from the deformity, practically normal.

Case 2. R. D. Operation, November 23, 1913. Practically the same as Case 1 as regards symptoms, treatment and result, except that death occurred from lobar pneumonia six months after the operation.

Case 3. M. C. Operation, January 8, 1914. The patient, aged fourteen, had spastic paraplegia for nearly a year which was relieved by means of a counter-pressure plaster jacket. During the next year, or the year immediately preceding the operation, however, it was necessary to keep her in a plaster jacket, in spite of which a well marked lateral curve developed. Since the operation she has had no support of any kind and seems as strong and active as a normal child, and her back gives her no discomfort in any way.

Case 4. M. W. Operation, April 15, 1914. Patient five years of age. Acute lumbar Pott's with beginning deformity, the child neither eating nor sleeping well. A sinus in the right groin discharged rather profusely. Operation included five lumbar vertebræ. The discharge from the sinus became clear in about ten days and the sinus closed in two weeks. The child made a good recovery up to the end of the fourth week, when he started a gastro-enteritis and seemed to have considerable abdominal pain. Two days later the sinus was re-opened and about four ounces of bright yellow pus evacuated. Patient was rather weak for several days, but the discharge from the sinus became clear. The sinus closed again in about ten days, but patient was not able to get up and about until the end of the tenth week, although there was no trouble referable to the back after the sinus closed the second time, and most of the inability was due to the gastro-intestinal condition. Patient up and about at the end of the tenth week; discharged at the end of the twelfth week. He was brought back a month later with a fairly well marked tuberculous left hip, for which we put him to bed with Buck's extension for about six weeks and then got him up with a short plaster spica. Motion at the hip when the spica was applied was practically normal. Patient was up and about for six weeks, when the hip became acute, and we have since had him in bed with Buck's extension followed by a long plaster spica. The graft in the spine seems to be perfectly healed, and patient has no symptoms referable to that condition.

Case 5. L. O. Operation, July 22, 1914. Patient, a boy, four years old, became paralyzed a year before operation with a flaccid paralysis of both legs; lost control of the bladder and rectum. Control of the bladder and rectum was soon regained, but patient seemed to have very little return of power in either leg. After operation patient up in four weeks and could stand by the bed in five weeks; he walked alone at the end of the seventh week and since then the improvement has been steady.

Case 6. S. R. Operation, July 7, 1914. Patient fourteen years of age. High dorsal Pott's with marked deformity. Complained of weakness. Operation; up at the end of four weeks and at present is apparently as strong as a normal child.

Case 7. A. S. Operation, November 12, 1914. Patient twelve years old. High dorsal Pott's. Complained a great deal of weakness, not being able to get about with the other boys without resting a great deal. Extremely nervous and suffering considerable pain. When I split the spinous process of the first dorsal vertebra about 2 cc. of bright yellow pus was evacuated. Cleaned out with a dry sponge; inserted graft; healing by first intention. Patient up by the end of the fourth week feeling much stronger. The general appearance of this case has changed for the better very materially since the operation, and he now complains of no weakness and seems to be normal except for the deformity.

Case 8. H. C. Operation, December 3, 1914. Patient, ten years old. Lumbar Pott's together with flexion, inward rotation and apparent fixation of the right hip. There was a sinus about 4 cc. below the tuberosity of the ischium, and another about the same distance below the great trochanter in about the same condition. The discharge was profuse, and it was my opinion before the operation

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that there was a tuberculous hip. The discharge from the sinus began to lessen almost immediately after the operation and motion at the hip became a great deal freer. At the end of the tenth week, patient started a gastro-enteritis and within a few days both sinuses discharged very freely, after which the gastro-intestinal symptoms improved. The discharge diminished very rapidly until now one sinus is entirely closed and the other nearly so.

Case 9. F. M. Operation, December 30, 1914. Patient, fourteen years old. Marked upper dorsal deformity. Complained of some weakness and pain. Patient up in four weeks after operation, having made an uneventful recovery. Feels much stronger and is able to get about with no difficulty. On August 1, 1915, he is normal in every way, except as to the deformity, and has had no trouble of any kind with his back.

Case 10. J. C. Operation, March 7, 1915. Patient, eight years old, had spastic paralysis of about one year's duration. Paralysis somewhat reduced by a counter-pressure jacket until the boy was able to draw up his legs in bed with some effort. Two weeks after the operation he could lift his feet off the bed. Shows very little ankle clonus. Patient able to walk five weeks after operation by holding on to the bed. Has now fully regained the use of his feet, shows no ankle clonus, and his general condition is improving very rapidly.

Case 11. P. L. Operation, March 25, 1915. Patient, three years of age. Slight spasticity; unable to walk. Mid-dorsal Pott's. Had worn a plaster jacket for one year with evidently very slight, if any, improvement. Well marked deformity. After operation, up in five weeks; walking alone in seven weeks.

Case 12. M. M. Operation, April 1, 1915. Patient, two years old. Mid-dorsal Pott's. The child was very irritable, cried a great deal, especially at night, and seemed to be in a great deal of pain, particularly when moved. One week after operation patient appeared to be much more comfortable than before and made a steady recovery up to the end of the fifth week, when she was able to sit up holding on to the side of her crib. Discharged June 16, apparently normal, except for the deformity, which is slight.

Case 13. D. H. Operation, March 18, 1915. Patient, twelve years old. Low dorsal Pott's with marked deformity. The chief complaint was pain about the crest of the ilia and patient was unable to sit in an ordinary chair on account of the pressure on the iliac crest. This disability was gradually increasing and caused considerable distress. Patient up at the end of the fourth week, able to sit in a low chair without distress, and discharged April 24 in good condition.

This case shows that it is possible in some instances to get an appreciable amount of correction in the deformity, as the ribs now clear the crest of the ilia and cause no pressure symptoms.

Case 14. M. A. Operation, April 15, 1915 Patient, seven years old. High dorsal Pott's, uneventful recovery. Patient up at the end of the fourth week. Discharged, apparently normal, except for the deformity, July 14.

Case 15. E. B. Operation, May 28, 1915 Patient, eight years old. Marked mid-dorsal Pott's with a marked spastic paraplegia. Unable to stand even by holding on to the bed. Up at the end of the fourth week; at the end of the fifth week walked along the bed by holding on. Since then he has been gradually improving until now he can walk with very little support.

Case 16. M. K. Operation, July 29, 1915. Patient, six years old. Mid-dorsal Pott's; marked spastic paraplegia. This case is mentioned, because the patient suffered well marked surgical shock after the operation. It is the only one in which I have seen any shock whatever, and here it lasted a very short time.

Case 17. F. L. Operation, April 27, 1915. Patient, nine years old. Severe mid-dorsal Pott's. Sinus in the right groin with profuse discharge. Patient's general condition rapidly failing. Skin sloughed over the graft, and at the end of the first week the middle of the graft was bare, together with its lower end. One week later the graft was entirely covered by fresh granulations, and the wound went on to heal by granulation. No part of the graft came away. Patient's condition improved for a while and the discharge lessened somewhat, but the case now is practically stationary.

Case 18. J. L. Operation, May 12, 1915. Patient, nineteen years old. Marked spastic paralysis. No evidence of any voluntary motion in either leg. The graft was broken in the middle when it was inserted. Nine weeks after operation, patient shows

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slight voluntary muscular contraction. August 1st, voluntary muscular action in both legs has increased.

Case 19. T. C. Operation, May 19, 1915. Patient, two and one-half years old. High dorsal Pott's. Since operation patient has had no pain or disability referable to the tuberculous condition.

In conclusion I would say that in this operation we have a means of treatment which is very satisfactory, and although some patients will of necessity be treated with a plaster jacket or Bradford frame until such time as the physical condition will allow us to operate, I believe that we have a procedure which is very rational, safe and to be employed in all cases with any symptoms of an active process, provided their general health will admit of operative intervention.

TUBERCULOSIS OF THE BLADDER.*

By E. J. MELVILLE, M.D., St. Albans, Vt.

The mucous membrane of the bladder, being of the non-absorbing variety, is more resistant to infection than that of other genito-urinary organs, which explains why vesical tuberculosis is nearly always secondary.

There are several possible methods of infection:

1. Hematogenous, or through the blood stream.
2. Through the lymph-channels.
3. By means of the secretions of urine or semen.
4. By continuity or contiguity.

It is thus easily understood that owing to the fact that the vesical neck is rich in blood supply and lymphatics the disease makes its first appearance here, or at the openings of the ureters, or in the trigone as an extension from an affected kidney.

The epididymis, the prostate, the seminal vesicles, the tubes, ovaries and kidneys are often the primary focus of infection, as neither the tubercle bacillus nor any of the pus-producing organisms can attack the normal bladder. However, should the bladder become ulcerated or eroded from gonorrhea or from instrumentation, or become congested from urinary retention, tumor or stone, it is peculiarly liable to be attacked by tubercle.

In the earlier stages of the disease, the diagnosis may only be clinched by the cystoscope, through which the lesions may be readily recognized if present, but in the later stages the cystoscope is rarely practicable on account of hemorrhage and contraction.

Unfortunately we general practitioners, from one cause or another, have not familiarized ourselves with this valuable instrument, and must perforce wait until the classical symptoms manifest themselves.

Since the kidney in most cases contains the primary focus and the bladder becomes infected secondarily, *polyuria* is a constant symptom. The quantity of urine may also be increased by reflex irritation from the bladder.

Frequency of urination is a constant and increasing disturbance, constituting as it were a vicious circle; the urine irritating the ulcerated sphincter vesicæ causes an almost constant desire to urinate and the contraction of the sphincter increases the depth and irritability of the ulceration. In the male the pain on urination is felt in the glans and prostate, as the sphincter squeezes the inflamed and ulcerated prostatic urethra.

Hematuria is an early symptom and red blood cells may be discovered by the microscope long before the urine shows any macroscopical change. In any suspicious case, then, we should search for red cells in the urine diligently, as it is at this stage of the malady that our patient will derive most benefit from rest in the open air.

While it is not always possible to decide which portion of the urinary tract is bleeding, still we should use the three glass test and remember that in urethral hemorrhage the blood comes in strings before the urine; in ureteral bleeding the blood comes after urination and is stringy: in bladder hemorrhage the blood is more or less mixed with the urine and may be passed in clots, while in renal hematuria the urine is of a wine color.

Tubercle bacilli are not always to be found in tuberculosis of the genito-urinary organs. It requires ulceration at some point to release them and supply them to the urine. They should be looked for only in freshly passed urine, as no doubt they decompose upon standing, especially if it undergoes alkaline decomposition.

Until secondary infection occurs the urine is clear and limpid, and acid in reaction, and unless a microscopical examination is made for blood cells the patient may pass the curable period

* Read before annual meeting of Franklin County Medical Society, September, 1914.

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ere the diagnosis is made. When pus is demonstrable in the urine macroscopically the disease is far advanced. Moreover, mixed infection does not remain long absent from such an inviting field, and when it enters, it adds its influence in grafting sepsis upon the already weakened patient.

The bladder soon becomes contracted and reduced in elasticity and capacity, and one that will only receive or retain a few ounces of fluid should be regarded with suspicion.

As in tuberculosis elsewhere, the untoward symptoms may abate and the patient recover completely for a short interval, or the course of the disease may be progressively downwards, the old train of symptoms increasing in intensity and frequency.

The pain at first manifests itself only at the time of urination, but sooner or later becomes constant and is not influenced by rest or exercise. Undoubtedly the mortal agony endured in cases of tuberculous cystitis is not exceeded by any other form of suffering. In some cases the pain is referred or radiates to the sacrum, groin, loin or thighs. In the cases which have come under the writer's notice pain has been absent during the later stages, perhaps on account of the contraction caused by the new growths in the walls of the bladder obtunding the nerve endings. In exceptional instances there is an absence of pain during the whole course of the disease, and occasionally there is pain but neither polyuria nor increased urinary frequency.

A symptom which I have not seen mentioned in any of the works consulted in the preparation of this article is increased sexual desire. It is almost constantly present in the old as well as the young whose pathology of whatever nature is situated in the posterior urethra or about the vesical neck. Some of the old men show much elation over this symptom and believe the vigor of youth is returning.

I am at present treating a man, by occupation a chef, who is suffering from enlarged prostate and chronic polyarticular arthritis with endocarditis, whose "libido sexualis" is extreme, and who indulges in copulation industriously every night.

Incontinence soon becomes a distressing factor, the urine irritates the skin of the buttocks and thighs, the mental condition of the patient becomes depressed, flesh and strength melt away and emaciation and anemia become extreme.

There is no disease in the list which gives to life's perspective a more sombre shading. During the terminal stages progressive deterioration is rapid. Unlike tuberculosis of the lungs, the patient is buoyed up by no hope of ultimate recovery, but soon becomes a dejected and gloomy morphinomaniac, and listlessly waits for death to free him from his own poisonous vapors.

While the nicer points of diagnosis between tuberculosis of the bladder and that of other organs in the genito-urinary group should be undertaken only by those who are familiar with the use of instruments of precision, yet it seems to the writer that to classify all cases of painful and frequent urination, hematuria and polyuria as cystitis, and let it go at that, is in the highest degree reprehensible, as all are agreed that our only hope of ultimate cure for one suffering from vesical tuberculosis is early and energetic treatment.

As tuberculosis is *per se* a non-pyogenic affection, fever is absent until the field is invaded by the colon bacillus or some of the many strains of the staphylococcus or the gonococcus. Then we have a fever not of tuberculosis, but of mixed infection, on account of the absorption of their soluble toxins by the system.

As in tuberculosis elsewhere, the mixed infection is the cause of many of the distressing symptoms and of death eventually. Sooner or later in most instances mixed infection is unavoidable, yet in our instrumentation of these cases we should exhibit our knowledge of asepsis and antisepsis in the superlative degree.

A hint in the diagnosis and treatment of vesical tuberculosis is that this affection is, according to many authors, made worse by instrumentation or by bladder irrigation. However, Rovsing washes the bladder repeatedly with a five per cent. solution of carbolic acid, and Bransford Lewis advises the instillation and retention, as long as possible, of four drams of an emulsion of iodoform in liquid petrolatum, one dram to the ounce; gomenol oil (a preparation of eucalyptus in pure olive oil), one to twenty per cent., or thallin sulphate, two to twenty per cent.

Those with authority to speak on the matter

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say that the primary focus, as the kidney, testicle, vesiculæ seminales or prostate, should first be removed and then the patient be given the benefit of open air, a generous diet and rest.

If conditions are not relieved by such procedures, the majority of surgeons regard the case as hopeless, yet Harold Stiles of Edinburgh advocates cystectomy, with transplantation of the ureters or ureter into the pelvic colon, by his original operation of plication. This operation of entering the colon obliquely and wrapping the coats of the bowel about the ureter in its passage is, I believe, original with Mr. Stiles, who uses it frequently in cases (tuberculous as well as non-tuberculous) where there is paralysis or destruction of the cut-off muscle of the bladder.

On the other hand, Robert Jones of Liverpool, whose experience in surgical tuberculosis is unequalled by any surgeon in the world, advises non-surgical treatment of the genito-urinary tract in children, and teaches that altogether too much stress has been laid upon the surgical treatment of renal and vesical tuberculosis.

In conclusion I beg leave to report two cases which may have some clinical interest to this gathering:

Case 1. Mrs. A. T., aged twenty-four, housewife; one child, aged two years. Family history good. Venereal history negative. First consulted writer October 11, 1909. Classic history of recurrent appendicitis with tenderness over right tube and ovary. Symptoms increasing in frequency and severity. Lungs, heart and kidneys normal, although no microscopic examination of urine was made. Operated November 24, 1909. Chronic obstructive type of appendix. Ovary enlarged, cystic. Tube swollen, tortuous and filled with a cheesy material. Appendectomy, right salpingo-ovarectomy. As no pathological specimen was sent to the laboratory, the offending micro-organism was conjectural. However from subsequent developments the pathology was probably caused by the tubercle bacillus. Recovery retarded by an obstinate cystitis which had its inception, or which at least manifested itself, after her first catheterization.

Right here I wish to say that no one but an expert should be allowed to pass the catheter. After you have allowed your patient to stand up, given a rectal enema, applied hot stupes to the pubes, given 2 cc. of pituitrin and have done everything you know for retention of urine, then catheterize with the danger of cystitis always in your mind. I do not accuse the nurse who catheterized this woman of sending her down to her death with this most loathsome of all diseases, but we all do know that one of the greatest triumphs of the junior nurse is the finding of the meatus after several ineffectual attempts. The further history of this case is one of vesical and renal tuberculosis, plus lupus of every mucocutaneous surface of the body, which developed in May, 1910, and which covered about one third of the surface of the body. This skin lesion spread to her neck, cheeks, thighs and buttocks, and when incontinence of urine showed itself a few months later her misery was complete. Dr. Townsend cystoscoped this case in June, 1910, but was unable to catheterize either ureter. She went to Montreal the same autumn and the left kidney was removed, which did not relieve any of her symptoms, and she returned to St. Albans where she died some time in 1912.

Case 2. Female, aged twenty; two premature births. Family history good. Venereal history negative. First consulted me May 6, 1906. Pain and frequency of urination; hematuria. Incontinence complete, night as well as day. General health good and strength not impaired. Lungs and heart normal. Condition has grown steadily worse for six months. Had medical treatment at spasmodic intervals. Examination under local anesthesia with Kelly's tube, with electric lamp attached to current controller, showed urethra and vesical neck ulcerated. From sides and base of ulcers, vegetations of unhealthy granulations sprouted up, forming papillomatous projecting masses.

Patient admitted to hospital, and under ether all growths burned away with thermo-cautery. Operation repeated twice at six weeks intervals on account of recurrence. Each time cauterization was carried deeper into the prevesical and urethral tissues. No attempt was made to spare the urethra or vesical sphincter, but the cautery was applied freely the third time until every vestige of the disease and much healthy tissue were burned away, and two fingers could be passed into the bladder and its walls palpated.

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Patient in hospital three months and left much improved. In the past eight years she has borne four healthy children. While she has had no return of her symptoms, she never has the desire to urinate, but empties her bladder at regular intervals day and night. If this be done at four-hour intervals she has no incontinence, unless the accessory muscles of urination are forcibly brought into play, as in acts of laughing, coughing or sneezing.

The preceding case is interesting from the fact that apparently the vesical neck was the primary focus, as no demonstrable lesion was discovered elsewhere at this time, nor has any developed in the intervening eight years. Myself and associates believed the growth at first to be malignant, until the laboratory report showed it to be a tuberculoma and demonstrated tubercle bacilli in the urine.

I had an excellent opportunity to examine this patient during her expulsive attempts at the termination of the second stage of labor three weeks ago, and found that while the urethra was only one-half as long as normal and was composed to a great extent of scar tissue, the edges remained in contact during the intervals of her pains, and even in the standing or kneeling position no urine escaped, showing conclusively that the vesical neck still possessed sphincteric powers.

RADICAL TREATMENT OF OSTEOMYELITIS OF THE LONG BONES.

By AUGUSTUS P. HAUSS, JR., M.D.,
New Albany, Ind.

The management of the various bone diseases has been anything but a source of pride to the science of surgery except in the last few years.

Years ago, the majority of bone diseases were immediately diagnosed as malignant or tuberculous, and the percentage of successful treatments was negligible.

In recent years, due to the phenomenal success of such men as Albee, Lane, Beck, Sunderman, Hutchison, Murphy and many others, surgeons are doing more successful work in the neglected field of bone surgery.

Probably no other form of bone disease has been misdiagnosed as much as osteomyelitis. Time after time it has been confused with sarcoma, tuberculosis, and even inflammatory rheumatism.

In this article I wish to emphasize three cardinal points:

(1) The importance of thorough post-operative drainage.

(2) The importance of exploring the medulla in all suspected cases, even if the bone seems apparently healthy.

(3) The possibility of preventing amputation even when the entire shaft of a femur is necrotic and there is marked septicemia.

Osteomyelitis does not originate in the compact tissue, but is an acute inflammatory disease of the spongy medullary tissue of bone. Starting in the epiphyseal end of the diaphysis, it usually extends upward into the shaft of the bone, but it rarely involves the joints except in young children.

Symptoms. There is usually an initial chill followed by high temperature and other constitutional disturbances, and by severe pain and redness in the affected part. When a suppurative form is present, the area will show marked fluctuation and swelling, or there may be a fungus abscess into which a probe will sink deeply. The femur and tibia are most frequently affected; however, the disease may be looked for in any of the osseous structures.

In the suppurative form with necrosis there is always an abscess in the medulla and periostitis is invariably present.

Etiology and Pathology. Osteomyelitis is generally the result of an infection from one of the pyogenic organisms, either a streptococcus or staphylococcus. The pneumococcus, tubercle bacillus, colon or typhoid bacillus may cause it. These cases usually give the history of some slight injury combined with a debility following constitutional disease. Cases have been known to follow furunculosis, infected wounds and compound fractures. Cold, traumatism and overexertion are contributing causes.

Necrosis or death of the bone may not only be due to osteomyelitis, but to periostitis which is always present. No matter what the pathogenic factor may be, the necrosis is due to an interference in the arterial circulation. This occurs by the medullary and periosteal lesions destroying the Haversian canals, or by the formation of numerous emboli.

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The pathology of bone necrosis is similar to that of gangrene in the soft tissues. The dead bone is separated from the living bone by a line of demarcation of inflammatory origin and is thereby isolated and becomes a sequestrum. This sequestrum may either become absorbed after undergoing disintegration, or it may remain imbedded in pus until it finds an issue or is removed.

The reproduction of bone in necrosis due to simple inflammatory causes is remarkable, especially when the subject is strong. Even over-production has been reported in these cases. In the cases involving the entire shaft of a long bone, the pyemia and toxemia are so severe that death frequently ensues. Many fatal results have been due to failure to recognize the true nature of the case early enough.

Early diagnosis aided by x-ray examination and radical operation are necessary to obtain satisfactory results.

Treatment. In any case giving the above history and symptoms, the surgeon should immediately make a free incision to establish drainage and lessen the absorption of toxins into the system.

It is advisable to extend your drainage entirely into the medulla in all suspected cases. For in many subjects where there is an early operation, the cortex of the bone and the periosteum will appear normal, yet upon opening the medulla you will find it filled with pus that needs only to be judged by its odor. The establishment of drainage into the medullary space can do no harm, and it invariably leads to a more rapid recovery.

In cases seen late in their development with marked septicemia it is often advisable to perform a series of operations rather than subject the already weakened patient to the severe shock and prolonged anesthesia of one complete operation.

Whether one or several operations are performed, the course of procedure is the same. An incision is made along the shaft of bone, extending as far as there is necrosis or sequestra. All necrotic or dead bone should be removed by a gouge or chisel, pus pockets should be freely incised, and the medullary abscess should always be opened.

In cases of total necrosis of the entire shaft, it is advisable to remove it entirely, leaving the periosteum intact. The wound should be swabbed out with dry gauze, but not irrigated. A rubber cigarette drain is then placed in the cavity of the periosteum. This not only establishes free drainage but prevents the periosteal cavity from collapsing. The edges of the periosteum should not be brought together, but should be held in place by sustaining sutures of silkworm gut through the muscular walls of the incision. The wound is then closely packed with iodoform gauze and left wide open. I prefer the open wound to the much heralded method of bone plumbage or grafting and immediate closure of periosteum and wound.

If the cavity is rendered thoroughly aseptic, the latter method would probably cause a more rapid recovery, yet we have no way of knowing when this asepsis is established, and there is always a possibility of a reinfection from some systemic source.

The open wound gives a direct outlet, decreases the absorption of toxins, and allows the surgeon an opportunity to watch developments and remove any loosened fragments or sequestra.

Within twenty-four to forty-eight hours following the operation the gauze should be removed, and if the inflammatory symptoms have subsided, a dressing of gauze saturated in a ten per cent. solution of balsam of Peru in sterile castor oil may be substituted for the iodoform dressing. The Peru balsam has certain antiseptic properties and renders the frequent dressing less painful. The member should be placed in a plaster or metal gutter, and held in position by sand bags and an extension weight.

The rubber drain may be removed during the first week and the oil packing should be changed every twenty-four hours for the first few weeks. After all inflammatory symptoms have subsided and there is no further odor or discharge of pus, the wound may be allowed to gradually heal by granulation.

Skiagraphs should occasionally be made in order to detect any loose fragments and to note the development of new bone.

It is only rarely that amputation is indicated, and then only after free drainage has failed to cause improvement and the gangrenous suppuration clearly shows that the patient's life is endangered. In such a case, however, the bone should be removed entirely in order to prevent recurrence. It is but rarely that the patient is able to survive the shock from an amputation in a case of this kind.

The management of a case of osteomyelitis

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should not be entirely surgical. I have found the mixed infection or autogenous vaccines to be of great assistance during the inflammatory stage. A solution of peptomanganate of iron or the arsenated hemaboloids is usually indicated to overcome the more severe forms of blood impoverishment, while during the redevelopment of bone, lactophosphate of calcium can be used to great advantage. Proctoclysis is helpful. The bowels and kidneys should be kept free and active, and a good mixed diet, plenty of fresh air and sunshine are essential in the management of this destructive disease.

A satisfactory restoration of bone will occur in the majority of these cases, and the fear of some surgeons that after the removal of a large portion of bone a permanent osseous defect will persist is not justified. The more radical measures will oftentimes preserve many limbs and prevent a corresponding number of amputations and deaths.

315 Pearl Street.

APPENDICITIS.

By J. A. HOFHEIMER, M.D.,

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When studying the subject of appendical disease one cannot fail to be impressed with the fact that a portion of the human anatomy so small and apparently useless should be the site of such frequent severe pathological conditions. However, when the anatomical situation and character of the appendix



Fig. 1. Case 5.

are considered, causative factors may be readily found for many of its disturbances.

The vermiform appendix varies in length from two to six inches; is about the diameter of a goose's quill; is hollow throughout its entire length, and opens from the cecum at the lower and posterior aspect of this portion of the intestinal canal. It is lined with mucous membrane, has a poorly developed muscular coat, and a fold of peritoneum surrounds it for its entire length. While the cecal attachment is always at a fixed point, the position of the blunt distal extremity is extremely variable.

The situation of the mouth or cecal end of the appendix is such that it may be distended by intestinal gases, especially if under any compression, as during constipation or in intestinal stasis from any cause, and thus becoming dilated it will readily admit particles of fecal matter or other infective material into its lumen. The weak muscular coat being unable to eject these foreign substances, allows them to remain in the organ until from the irritation caused by their presence ulceration or abscess formation occurs. This leads to further distention of the canal, thinning of the walls of the appendix, and later to perforation. These foreign substances may be arrested at any point in the organ and set up an inflammation at this site.

The changes going on outside the appendix while the foregoing conditions are effective inside have to deal with the increase of leucocytosis and lymph exudate, which tends to wall off the diseased organ, and this offers a protection to the general economy. That more lives are not lost before operative measures are adopted is mainly due to this effort of Nature to seclude this offending member while undergoing these pathological changes.

Many authorities ascribe this disease entirely to microbic infection or to colds; but I have so frequently encountered small particles of fecal matter in the interior of the appendix and in some cases concretions of considerable size (as in Case 6), that I find it difficult to ascribe the primary cause to other than chronic constipation and its allied disorders.

Recently another cause has been noted by Dr. Hertoghe[1] of Antwerp, Belgium. He claims that thyroid insufficiency predisposes to both enlargement of the tonsils and to appendicitis. He supports this theory by his recent observations on a series of individuals presenting signs of hypothyroidism. In a large proportion of these cases tenderness in the ileocecal region was found present. This author considers that a combination of hypothyroidism and ileocecal tenderness indicates an exploratory operation. During the past year he performed 126 appendectomies, of which 90 were for chronic appendicitis. These 90 patients were operated upon merely because of the co-existence of hypothyroidism with ileocecal tenderness, and in not a single instance did it prove unnecessary.

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It is frequently difficult to get the layman to understand the gravity of this disease. Since the ailment has become of such common repute the old adage of "familiarity breeding contempt" seems exemplified.

If the appendix could always be operated upon early, before adhesions had formed or complete ulceration had occurred, then we might be able to look upon appendicitis as a mild disease; but unfortunately, the cases are generally complicated when first seen, or have been subject to such procrastination in treatment either on the part of the patient or his medical adviser, that removal of the offending organ is far from being a simple matter, and very often necessitates the exhibition of considerable skill on the part of the surgeon both during the



Fig. 2. Case 6.

operation and with the after treatment. Frequently cases are met with which present such difficulties and complications that the operation has to be divided into two or more steps.

Though many cases have been operated upon when almost moribund, with a successful outcome, yet it is always better to be able to reach an early diagnosis and perform an immediate operation.

The classical subjective symptoms are present in most of the cases, but there are many individuals presenting themselves for examination who have atypical symptoms, and these are often difficult to interpret. Simple acute catarrhal appendicitis is usually easy to diagnose, and the McBurney point tenderness is readily mapped out; but it is in those cases with chronic recurrent attacks, in which are found adhesions or kinks and malposition of the appendix, with tendency to ulcerative and gangrenous conditions, that diagnosis is often difficult.

The location of pain as a diagnostic symptom cannot always be depended upon, and this often gives rise on the part of the laity to a feeling of disbelief in the diagnosis and a doubt as to the seriousness of the patient's condition. It is generally in those patients whose symptoms are at variance with the normal location of the appendix that we find adhesions or other complications, which will add to the doubtfulness of the prognosis and which should cause the consultant to urge the greater need of operative measures.

Gibbons[2] states that the McBurney point is often misleading. Fowler[3] had three cases out of eleven operated upon in which pain was most marked on the left side and the appendix was found to the left of the rectus. Deaver[4] also mentions that the localized point of tenderness is frequently referred to the left side. Thew Wright,[5] of Buffalo, reviews his recent cases as follows: Catarrhal, 57; suppurative, 48; gangrenous, 9; and perforative, 35. In other words, over 60 per cent. were complicated. He further states that "it has been interesting to note how few of the cases have shown the appendix to be that usually displayed in the text-books as normal."

In fact, the appendix has been seen adhering to the liver, the gravid uterus, to the testes by way of the inguinal canal; it has been known to extend across the abdominal cavity, and it may become adherent around other portions of the intestinal canal, producing strangulation of the bowel. The appendix has also been found attached to an ovary, or a kidney, or to the iliac fossa. The retro-cecal appendix, occurring in about one in every eight cases, is not usually diagnosed early.[6]

The following histories may serve to illustrate some of the protean aspects of appendicitis and the conditions found on operation:

Case 1. Fred W., aet. 22. Patient complained that he had been kept awake all of the preceding night owing to a severe burning pain in his right heel, and thought that he had rheumatism. Examination, however, failed to show any redness or swelling present; nor was there any tenderness upon pressure at the heel. Thinking that there

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might be some irritation along the sciatic nerve a close examination was made of the leg, but no tender point could be found until the lumbar region was reached, and then pressure along the iliac crest elicited expressions of pain. These became more pronounced as the examining fingers approached the anterior part of the abdomen. The abdominal muscles of the right side seemed slightly more tense than normal, and this with the slight fever that was present and rapid pulse led me to make a diagnosis of appendicitis. The patient could not be prevailed upon to submit to an operation until nearly a week later, when his symptoms became more pronounced. In this case the appendix was found enlarged and empyemic, but luckily had not ruptured. Good recovery.

Case 2. Mrs. M., aet. 70. When first seen this case presented a large fluctuating swelling in the right groin. A diagnosis of abscess of the inguinal glands was made. An incision was made into this mass and a large amount of foul smelling pus was evacuated, which seemed to come from above Poupart's ligament. After the pus had been cleansed away, a long gangrenous piece of tissue was found hanging in the wound. The wound was then enlarged by making another incision at right angle to the first one and extending it above; it was then discovered that I had opened into a hernial sac containing the appendix. The lower end of this sac with the appendix had become strangulated and had sloughed, thus causing the abscess. All drainage was removed after five days, and the patient made a complete recovery. Owing to the age and feeble condition of this patient the operation was performed with cocain, and while fully conscious throughout the ordeal she gave no evidence of feeling pain.

Case 3. Samuel S., aet. 19. Diagnosis of appendicitis was made in this case a week prior to consent being given for operative interference. At the time of operation a distinct tumefaction was noticeable at the McBurney point. The patient's temperature was high and his pulse was very weak, symptoms of general sepsis being present. Upon incision being made a large amount of fetid pus was evacuated, along with several particles of fecal matter. The abdominal cavity was washed out, and from the bottom of it I picked up the gangrenous appendix, which had been spontaneously amputated, leaving a small fistulous opening into the cecum at its former site. The tissues about this point were so badly inflamed and friable that a resection of the gut was proposed, but as the condition of the patient was bad and considering his youth, it was concluded to adopt a more conservative plan. The abdomen was gently irrigated with a solution of iodine in sterile water (10 per cent.), and then flushed with a normal salt solution. A drain was inserted up to and behind the cecum. Five through-and-through silk-worm sutures were introduced—but not tied. The ends of these sutures were fastened to either side of the wound by adhesive strips, so that they could not pull out. This permitted the wound to gape and drain thoroughly. Irrigation with the iodine and saline solutions was at first attended to daily; on the first four days small amounts of fecal material were discharged into the dressings, which were so applied that the abdomen was not soiled. Gradually the bowel resumed its normal color and granulations closed over the fistulous channel. After the sixth day the entire wound looked so well that I felt reasonably safe in closing it, which was done by removing all drainage and tying the sutures which had been previously inserted at time of operation. The subsequent healing was rapid and the patient was able to walk about in his room on the twelfth day after the operation.

Case 4. Marshall F., aet. 28. Patient had suffered from an attack of acute appendicitis a short time previously, which had apparently yielded to medical treatment. A month later, after a protracted railway journey, he was seized with such severe pains that removal to the hospital was necessitated upon his arrival at his destination. Under treatment similar to that given on his former attack his urgent symptoms subsided; he then returned to the city and examination showed a marked tenderness over the right side, and an immediate operation was advised. Upon opening the abdomen two days later, the colon was found to be firmly bound with adhesions running into the iliac fossa, and the intestine was deeply congested. The appendix was adherent by its tip to the retro-cecal fossa and bent at a right-angle; it was of a deep mahogany color and very rigid, but not perforated. After the adhesions had been severed and the appendix had been removed, an incision into it revealed two ulcerations. Recovery uninterrupted.

Case 5. Eugene S., aet. 22. Recurrent appendicitis. In this case the pain was diffused over the

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entire abdomen, with slightly greater tenderness on the right side. Operation performed by means of the Battle incision. The peritoneum and overlying tissues were agglutinated and of a congested hue, and considerable serous fluid escaped upon opening the peritoneum which had to be cautiously done as the cecum was firmly adherent to it. After breaking up these adhesions there followed a gush of about four ounces of pus from back of the cecum. This was washed out in the usual manner, and the appendix was picked out of the cavity, having sloughed off to within an inch of the gut. The stump was ligated and its extremity cauterized with phenol and alcohol; the wound cleansed with iodine solution and closed in layers, a drainage tube being inserted well back of the cecum. The following day the patient's temperature became normal; the drainage tube was removed on the third day after the operation, and a small piece of aristol gauze was inserted in its stead just between the lips of the wound. This was removed on the sixth day, and a complete recovery ensued (Fig. 1). The appendix in this case was very long and had a diverticulum at its upper third, while below this point it was contracted; this pouch had ruptured, thus causing the ensuing abscess.

Case 6. Frank S., aet. 20. About two weeks prior to consulting the writer he had been attacked with a severe pain in his right side, which forced him to walk in a stooped posture and was increased upon going up and down stairs. This discomfort lasted for two days, but no medical advice was sought at this time. During the subsequent two weeks he had slight recurrences of the pain and his bowels became constipated. The day he first came to my office the pain was slightly increased in severity, and he had developed a fever of 101.6 deg. While there was slight tenderness at the McBurney point, the pain was most marked along the ascending colon and over the iliac crest. A small indurated point was felt above the crest of the ilium, and there was rigidity of the abdominal muscles. The following morning his temperature having risen to 103 deg., an immediate operation was advised. The incision in this case was commenced at McBurney's point and carried *upward* and *outward* for nearly four inches. The gut was darkly congested, and adhesions bound the intestines down very firmly, making it difficult to find the appendix. Passing my hand into the wound, a tense fluctuating mass was felt behind the colon and above the iliac crest, into which my index finger suddenly punctured and several ounces of thick pus flowed out, thus relieving the tension. Hooking my finger in the opening in a downward direction toward the caput coli, I found that the tip of the appendix was imbedded in a mass of adhesions which had enveloped the encysted abscess. Following its course carefully enabled me to dissect the diseased organ away from the intestine to which it had been firmly bound in this malposition. Upon its removal it was found to be unusually large and greatly thickened at its distal extremity (Fig. 2). This end of the appendix was thickened and formed a pouch which had ruptured, and in its interior was found a good-sized concretion, a photograph of which is here given (exact size). The usual toilet of the abdomen with drainage was carried out, and the patient was able to be up and about on the fourteenth day.

Case 7. Joseph M., aet. 40. Patient had suffered from constipation for several months, often going four and five days without defecating. Just preceding this latest attack his bowels had not been relieved for six days, and then only after numerous enemas had been given. He consulted Dr. E. N. Roeser for an abdominal tenderness from which he was suffering, and the doctor diagnosed appendicitis, an opinion in which I concurred when called in consultation. Urgent operative measures were deemed necessary and were taken by me the following morning. The peritoneum was found greatly thickened and congested, and when opened the omentum bulged freely into the wound. The lower end of the omentum was attached by numerous adhesions to the pelvic fossa and about the intestines; the colon was adherent also in several places and almost immovable. These adhesion bands had caused a partial obstruction of the intestinal canal. The omentum had folded upon itself forming a pocket about the appendix which had become perforated, and this pocket was full of pus. The appendix in this case was long, and an ulcer in its upper portion had destroyed the tissues so that the organ was partially amputated by its erosion. After removing the appendix, the omentum was drawn up out of the wound and examined. It was found to be so badly diseased at this point that a section

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about four inches square was amputated, after duly ligating the vessels. The kink at the ileo-cecal junction was then relieved, and the bowel permitted to assume its normal position. This patient made an uninterrupted recovery, his temperature remaining normal from the day following the operation, and his bowels acting daily without cathartics.

The pain in Case 1 was unusual in its situation, but it was otherwise uncomplicated. Case 2 was of the type mentioned as complicated with hernia. It is often difficult to diagnose what the contents of a hernial sac may be, and in this case even hernia itself was not suspected. In Case 4 the appendix was long and of the "kinked" variety. These long appendices are more apt to become kinked and form adhesions than the shorter ones. Cases 3, 5, 6 and 7 each presented serious conditions, and in each instance the patient's recovery was by a narrow margin. Case 6 suffered also very much after the operation from retention of urine and meteorism, which lasted about a week. The bladder was relieved by catheterization, and the intestinal peristalsis was stimulated by hypodermics of eserine sulphate.

The use of this drug given in 1/100 grain doses is very effective in stimulating peristaltic action. I usually inject it every three hours until the desired result is attained.

The writer has found that washing out the pus cases with a solution of tincture of iodine (10 to 25 per cent.) in sterile water at blood temperature acted as an effective antiseptic, deodorizer and stimulant to the wound. In all my cases for the first five or six days the beds were kept in a pronounced Fowler position.

The subject of prophylaxis in appendical disease is a difficult one to solve, especially as the causative factors seem so numerous. In the majority of cases, however, a history of chronic constipation and flatulency is obtained, chronic intestinal indigestion being generally present. Whether due to constipation or to microbic infection, the axiom stated by Caille[7] in his treatment of typhoid fever is also true in these cases, "The best intestinal antiseptic is bowel action," and every effort should be made to obtain this result with regularity.

If, despite our every care, appendicitis should occur, then we can but reiterate the expression of Dr. R. Hazen,[8] who tersely states, "Early recognition and early operation is the only safe and conservative dictum for appendicitis."

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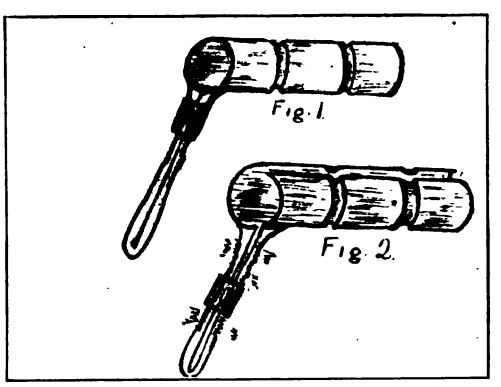
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FACILITATING THE CONNECTION OF BLOODVESSELS.

An Instrument and Technic for Its Use.

By ALFRED KAHN, M.D., New York.

As per illustration herewith shown, this instrument consists of a cannula mounted on a spring rod; the rod being threaded for the play of a screw. The cannula is divided in half, so that when the screw on the rod is down the spring throws the cannula's jaws apart, giving it an open mouth. When the screw is advanced upward, the jaws are closed and the

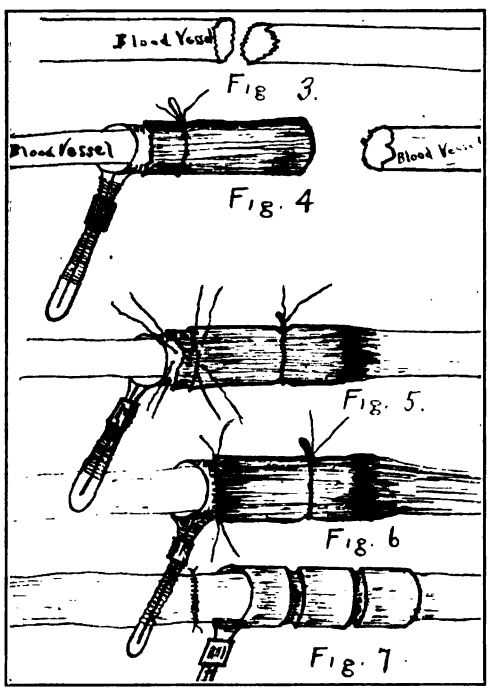


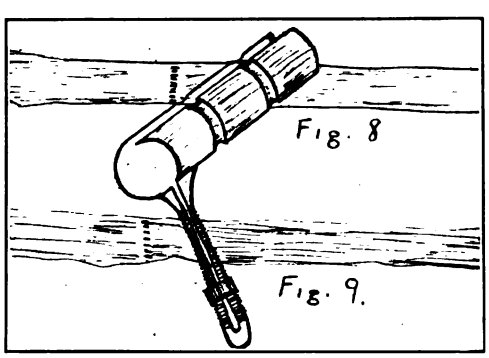
cannula is a tight tube. This instrument is very similar to the instrument described by the author in the *Medical Record* of September 19, 1914. The outer surface of the cannula is grooved in two places as per illustration. For convenience, in the description following, I have called these the anterior and the posterior grooves respectively.

Technic. One end (Fig. 3) of a divided bloodvessel is passed through the cannula and cuffed back (Fig. 4). The cuffed end is held in place by a ligature passed around the bloodvessel and tied in the posterior groove (Fig. 4). The other end of the divided vessel (Fig. 3) is looped over the "cuffed back" end of the vessel (Fig. 4), and then a ligature is passed around the cannula and bloodvessel's

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ends, binding all of them in the anterior groove (Fig. 5). This maneuver holds the parts firmly on the cannula. The first ligature is now carefully cut, leaving one ligature on the anterior groove, where the two ends of the vessel are held firm. The operation having reached this point, all clamps can be removed and the circulation allowed to return. It is now only necessary to sew the two ends of the severed vessel together (Figs. 5 and 6). The vessel having been united, the ligature holding the vessel at the anterior groove is cut, and the vessel drops away from the cannula into a straight line (Fig. 7). Now the screw is slid down; the spring expands, separating the jaws of the cannula so that it can be taken off the vessel (Fig. 8); and the circulation is established through the severed vessel.





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34 East 40th Street.

NEPHROLITHIASIS.

By LEWIS WINE BREMERMAN, A.M., M.D.,
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Cases of renal and ureteral stone are of more common occurrence than is generally supposed. They come very frequently under the observation of the urologist, and as the condition many times is atypic and may resemble numerous other affections, I feel that a brief discussion of it would be of benefit to the general practitioner who sees relatively few such cases. As the subject is a broad one space will allow of only a brief account of those features which, to my mind, are of paramount importance—etiology and diagnosis, with a reference to treatment.

Numerous theories have been advanced regarding the causes of stone formation, but I am convinced beyond a doubt that first and foremost in the etiology must be considered systemic or general factors, consisting of derangement of the functions of the digestive organs, of the organs or structures charged with the elimination of the waste products of the body, of the organs by which oxygen is taken up into the system, defective supply of oxygen in the air inhaled and insufficient muscular activity. In fact, these may be summed up into faulty metabolism, poor assimilation and poor elimination —any of the conditions which are prime causes in either decreasing the solvent quality of the urine or increasing the normal crystalline elements so that they are in excess.

I do not believe that these factors are sufficient to produce stone in the kidney; there must be some more prominent exciting agent. From careful investigation and study of the numerous cases that have come under my observation, I am sure that the exciting element must be a deviation from the normal structure of the kidney, usually produced by some inflammatory changes either of a very

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mild type or of marked bacterial origin. This inflammatory condition is sufficient to produce enough irritation to start a process of crystallization in the presence of those elements found in the urine accompanying faulty metabolism; therefore the inflammatory process must precede the formation of stone, being exaggerated later, of course, by the presence of the calculus.

The most frequent period for the formation of stones is between the ages of 20 and 40 years, occurring more often in the male than in the female. They may be formed of any of the urinary salts alone or in combination; they may vary in size from a few grains to many ounces, may be single or multiple, unilateral or bilateral. I will not dwell upon the changes which may take place in the kidney structure due to the presence of a calculus, only to say that they are usually of such a serious nature that it behooves us to make an early diagnosis and institute proper treatment. Therefore, I will endeavor to bring clearly before you the various modes of diagnosis.

Whenever I have an opportunity to address an audience of medical men I never hesitate to bring before them the importance of physical examination of patients several times during the year, even though they be in apparent good health, at the same time making a complete chemical and microscopical analysis of the urine. I have no trouble in getting my patients to come to see me when I inform them that frequently we can recognize a condition early and thus prevent serious illness often accompanied by grave complications. I am sure you will see the logic of my position, for no disorders are of greater seriousness than those of the urinary tract, and they can be recognized early many times before they produce symptoms; so it is with renal or ureteral stone.

The most characteristic symptom of renal calculus and that which usually brings the case under our observation is renal colic, the nature of which is familiar to you all; yet there are cases which do not present symptoms and we will be compelled to diagnose them from other conditions. The most constant symptom is hematuria. It must be remembered that this bleeding need not be in sufficiently large quantity to discolor the urine; the blood may be present only in microscopic quantities.

Pain is a fairly constant symptom and in the typical cases occurs in the affected kidney. Renal colic is so characteristic that it needs no description. The pain may be mild in character, may be more or less constant, or may be absent for longer or shorter intervals.

Do not forget that pain is no indication or criterion as to the location of the pathologic condition, as the kidneys are intimately associated through the sympathetic nervous system and often pain is located in the region of the healthy kidney. This condition has been brought to my attention so frequently that I cannot refrain from calling attention to it. I have seen severe pain occur in the region of the healthy kidney, while the opposite one was pathologic.

In the majority of cases of renal calculus, pus is present in the urine in variable quantities, and if the urine from the kidneys be separated, the pus will be found coming from the diseased organ. This, too, may be only in microscopic amount, and it is usually associated with an excess of some of the crystalline elements of the urine as well as renal and pelvic epithelium and occasionally casts. Physical examination of these cases is important, for I think that pain upon pressure, exaggerated by deep pressure, is one of the most suggestive signs of renal calculus.

In all cases of kidney irritation there is usually an accompanying bladder irritability, noticed particularly in frequency of urination; so when a patient under observation complains of this symptom, remember the possibility of stone in the kidney. The writer has seen several cases where this was the only symptom present.

The means of diagnosis are many, but the following, in the opinion of the writer, are the best regarding the evidence which may be ascertained.

1. Cystoscopy.
2. Careful microscopic urinary analysis of separate specimens from the kidneys.
3. Ureteral catheterization.
4. Use of bismuth catheter or lead catheter in conjunction with the x-ray.
5. The wax tipped catheter.

Cystoscopy is of exceeding value, particularly from the negative point of view, by demonstrating that the bladder is normal and is not the cause of the symptoms. Careful study of the ureteral orifices

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must be made, because it will give us evidence as to whether or not the kidneys are involved.

When one orifice is altered and the other normal, the renal lesion is most frequently on the side of the abnormal ureter, and the character of the deformity of the orifice may indicate the nature of the renal condition. A pin point orifice is usually characteristic of a stone impacted in the ureter near the orifice; occasionally a small calculus may be caught immediately within the orifice and can be readily seen by the cystoscope.

Microscopic examination is important, for blood and pus in the urine over a longer or shorter space of time indicate stone in the kidney or ureter and further examination is necessary for an accurate diagnosis. The examination of the catheterized specimen is necessary, for thus we learn that the one or both kidneys are involved. It must not be forgotten that stone is bilateral in about 40 per cent. of the cases.

An x-ray is the most valuable means of diagnosis, as a positive picture indicates definitely the condition and location of the calculus. It is necessary to incorporate both kidneys and bladder in the pictures. Metal or x-ray catheters should always be in place, as they will give the accurate course of the ureter which is important, since a shadow due to calcified glands or enteroliths might be mistaken for a ureteral calculus.

In ureteral stones, particularly, the wax tipped catheter is very valuable. Scratch marks made by a stone are very characteristic and will enable us to make a positive diagnosis. Frequently I have been able to make a diagnosis of ureteral stone by the scratch marks when the x-ray picture was negative.

A stone in the kidney or renal pelvis, whether it be productive of symptoms or not, should be removed surgically, provided both kidneys are not markedly destroyed by the calcareous formation and below the normal in their functional capacity. Ureteral calculi, no matter what their position, should never be operated upon until all other methods for their removal have failed. Over 50 per cent. of the ureteral stones pass spontaneously, and a great proportion of those that become impacted can be removed by intravesical and intraureteral operating through the cystoscope. I have accomplished this in many cases.

The surgeon is apt to feel that just as soon as a renal or ureteral calculus has been removed his work is finished. He overlooks the etiologic factors entirely. The patient must be given careful direction as to his mode of living and his diet must be carefully regulated.

The pyelitis or pyelonephritis which coexists with the stone must be eradicated, and the urine must be pus and bacteria free before the patient should be discharged. Overlooking these points is the reason that we see so many recurrences of kidney stone.

In conclusion I would emphasize the following points:

Remember that in every case of frequency of urination stone in the kidney or ureter is to be suspected, and confirm or disprove the condition by accurate examination.

Remember that blood and pus in the urine for a long period, even without other signs, may mean stone.

Do not forget that stone is frequently bilateral.

Do not forget that x-ray findings may sometimes be negative when a stone exists. Here one must depend upon the clinical features of the case.

Remember that the wax tipped catheter is an important diagnostic instrument.

It must not be forgotten that most ureteral stones may be removed without resorting to open operation, while renal stones for the most are strictly surgical.

Remember to x-ray every obscure genito-urinary case that comes to you, as a stone may be the exciting cause of the symptoms.

The Monroe Building.

Conservative Operations in Chronic Adnexal Disease.—Dr H. L. Coopman (*Zentralbl. f. Gynaek.*, No. 16, 1915) makes a plea for the conservative treatment of adnexal diseases. If this fails vaginal puncture, colpotomy, should be tried. If, however, repeated recurrences take place, the abdomen should be opened, the tubes removed if necessary, but a portion of ovary left behind if possible. The uterus should not be removed except in extreme cases, as this has a beneficial effect upon the mind of the patient. In many chronic cases in which pus is suspected the cyst is found to contain a serous sterile fluid (sometimes coli bacilli are present). The appendix, which is almost always affected, should be removed in every instance.

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THE VALUE OF LABORATORY WORK TO THE SURGEON.

By H. VON WEDEL, PH.D., Dobbs Ferry, N. Y.

According to Mayo, the art of the diagnostician lies in weighing the evidence at hand, and it is the rule that a correct diagnosis, if made at all, will be based on comparatively few signs and symptoms of definite value.

How often is the surgeon and physician confronted with the task of making a diagnosis in a case when definite signs and symptoms are either lacking altogether or are so confusing that his diagnosis is more of a guess than anything else. However, the clinician of to-day is gradually becoming more and more desirous of finding out just what the excretions and the tissues of the body can tell him in the many obscure cases that are constantly occurring.

It is in just these cases that the various laboratory examinations are of the utmost value if carefully selected, carefully carried out, and made frequently enough to give the surgeon a fair knowledge of the patient's condition.

These various laboratory examinations are being recognized more and more both by the physician and the surgeon as giving very important aid in diagnosis. This aid would be very much greater if the surgeon were well versed in the various laboratory tests. Not so much that he could carry them out himself, but that he could better understand their possibilities and also their limitations, thereby avoiding the condemnation of laboratory work in general because it failed to give him information in some important case.

All data should be co-ordinated by the clinician, but to do this he should not only have an adequate knowledge of technical pathological examinations to interpret the findings of the pathologist, but he should visit the clinical diagnostic laboratory, so that he may keep in close touch with its methods, scope and results.

THE VALUE OF GASTRIC CONTENTS AND STOOL EXAMINATIONS TO THE DIAGNOSTICIAN.

According to Eusterman[1] repeated hemorrhage in the presence of a preceding history of gastric disturbance, with pain or distress, signifies an ulcer of the duodenum or stomach in more than 90 per cent. of the cases. Examination of the gastric contents and meat-free stool for occult blood is of undisputed value in the differential diagnosis of doubtful cases, and in estimating the effectiveness and the duration of dietetic and medicinal treatment. However, positive occult blood findings, unless taken in conjunction with the clinical symptoms and physical findings, may lead to wrong conclusions.

Again Sanford[2] very aptly remarks that it is quite generally acknowledged by clinicians that there should be more stool examinations in routine clinical work, and yet there seems to be a constant tendency to avoid this branch of laboratory technic. It is to be hoped that by emphasizing certain points the practical nature of examination of feces may be seen, and the possible diagnostic importance of the procedure in any practitioner's hands be not underestimated. He concludes with a plea for more consideration of the clinical value of a systematic stool examination. A simple technic is all that is necessary or desirable, and the finding of a parasite that may perhaps be the cause of an obstinate bowel disturbance will surely repay one for the time spent. We have been schooled to believe that amebic dysentery is a tropical or subtropical disease. To be sure, we see it in its more severe forms in those climates where the resistance of the patient to all types of infection is lowered. Text-books are published annually with antiquated ideas borrowed from previous publications, and erroneous views are thus perpetuated. We should realize that in the north intestinal parasites are of great importance, and that there are still many problems to be solved in the field of parasitology.

THE WASSERMANN TEST.

Is there any value in making a Wassermann test on a patient whose history is absolutely negative? The question is answered by the two following cases.

Case 1. Described by J. B. Murphy[3], who said the possibility that the tumor present might be a syphiloma was considered very unlikely. There was nothing to speak in favor of this diagnosis except the equivocal report of the pathologist, and there were many things which spoke against it. Upon operation the tumor was proved to be a syphiloma and when a Wassermann was later made it was very strongly positive. The patient

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was placed on treatment, the operative wound healed, and there were no further clinical manifestations.

Case 2. Mrs. X., aged 40, had had several ulcers that refused to heal under the usual methods of treatment. She had been treated for bone tuberculosis by at least ten different surgeons during a period of over six years. A Wassermann was made last June and a sixteen unit positive reaction obtained. She was placed on treatment and the ulcers were completely healed in four months. Is now nearly normal.

BLOOD EXAMINATIONS.

How often is a surgeon confronted with the task of deciding whether to operate at once or to wait until the physical condition of the patient becomes more favorable? Would not a blood examination give the necessary information? In many cases it would.

The three following cases are very typical and all occurred in one hospital within a month.

Case 1. Patient, adult, female, was admitted to the hospital complaining of pain in the region of the appendix and general intestinal tenderness. Her temperature at admittance was 104—no rigidity of the abdomen. She had one chill and slight nausea. The case was diagnosed as probably acute appendicitis. Blood examination was ordered and was as follows: White blood count 7,000; polynuclears 65 per cent.; red cells showed very marked anemia and many plasmodia of malaria were found just previous to the stage of segmentation. This patient therefore was not operated on, but received quinine and left hospital in twenty-four hours feeling normal.

Case 2. Mr. S., on November 21st, at 10 p. m., was seized with a severe pain in the abdomen. This continued through the night. In the morning he took some salts and at 6 a. m. he vomited. He entered the hospital at 3 p. m. with a temperature of 99.8° F. His pulse was not rapid and he vomited only once. He was only slightly sensitive to pressure over his appendix, but had had severe abdominal pain all day. One would think from this history that he was getting well, for his pain had practically subsided by night. (And these few symptoms are about all one has to go by in most cases.) The case was diagnosed as appendicitis, but the surgeon did not think that the condition was severe enough to demand an immediate operation. Blood examination was made at 8 p. m., and showed white blood count 18,000, polynuclears 88 per cent., eosinophiles, none found. Patient was operated on at once and a gangrenous appendix with a large amount of free pus was found.

Case 3. Male, adult, entered hospital with symptoms of acute appendicitis and peritonitis. Blood examination was made with the following results: White blood count 30,000, polynuclears 94 per cent., no eosinophiles. Patient was operated on and a gangrenous appendix and local peritonitis were found.

FAILURES IN LABORATORY WORK.

The failures in laboratory work can usually be traced back to three main causes:

Firstly. Carelessness in taking the specimen either by the pathologist or the surgeon.

Secondly. Making only one examination, whereas a second or third might have given the desired information.

Thirdly. The non-resistance of the patient.

Happily the first of these causes can be avoided by intelligent co-operation of the surgeon. If the surgeon would realize by his own previous experiences in laboratory work, the difficulties the pathologist, bacteriologist or serologist has to contend with, he could avoid some of the following common mistakes:

Tissue for histological examination is often sent to the laboratory wrapped in gauze, instead of being placed in some fixing fluid as soon as removed from the patient.

It is quite a common habit for some surgeons to snip off a piece of tissue from the tip of a tumor, possibly giving the pathologist only thickened epithelium to examine, instead of the true tumor tissue, probably only a few m.m. below. The result of this is very forcibly pointed out by Murphy[4], in the following words: "The pathologist's report in this case has relatively little value, we think, because he did not get much tissue to examine. His opinion holds good for only that specimen of tissue which he examined. The rest of this tumor may show quite a different appearance."

Specimens of gastric contents are often taken for the determination of acidity, and rendered

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absolutely useless for this purpose because the physician allowed some saliva, which is very alkaline, to run down the stomach tube into the vessel containing the gastric contents.

Stools which are to be examined for blood should be taken only after the patient has been placed on a meat-free and chlorophyl-free diet for twenty-four hours. No laxative should be given, but an ordinary stool should be sent to the laboratory for examination.

Stools which are to be examined for parasites should only be taken after the patient has been given Epsom salts early in the morning, and the specimen should be obtained four hours later.

Other instances which can be avoided with a little care are of common occurrence.

The second cause presents an entirely different problem. In the hospital it is of course a simple matter to have one or a dozen examinations made in every case, but in private practice the question of expense to the patient is very often of prime importance. It therefore behooves the pathologist to co-operate with the surgeon in making enough examinations to be sure that a negative report is of some real value. In this matter alone, if the surgeon would realize the value of repeated examinations in the face of a negative report, he could make the laboratory results mean a great deal more in a doubtful diagnosis, by simply explaining the financial condition of the patient to the pathologist and enlisting his co-operation.

If a negative result were obtained in the first examination of a patient who could not well afford to pay the regular fees for repeated examinations, I am sure that there would be very few pathologists who would not be willing to make the two or even three that may be necessary for the same fee that would ordinarily be charged for one, as for instance, in examining sputum for T. B., blood for plasmodium malariæ, making blood cultures for typhoid bacilli, streptococci, etc. All these examinations very often give positive results the second or third time if negative in the first place.

The third cause, that is the non-resistance of the patient, presents a much more difficult condition to deal with.

Here we are dealing with a condition that brings the surgeon face to face with the problem of determining just what a pathologists's report means. Take for instance the blood reports of three patients, all acutely ill with symptoms simulating appendicitis.

Case A. The following blood report was presented: White blood count 20,000, polynuclears 82 per cent., eosinophiles ½ per cent. Physical condition of patient apparently indicated a good resistance; temperature up to 104°. Upon operation the appendix was found to be markedly swollen and inflamed, but with no pus formation. This was a very acute but clean case. The high total count indicated the ready response of the patient's resistance to the infection.

Case B. Blood report: White blood count 10,000, polynuclears, 80 per cent., eosinophiles ½ per cent. Physical condition of patient apparently showed good resistance; temperature up to 103°. Upon operation the appendix was found to be moderately swollen and inflamed with a moderate amount of pus formation, which was walled off by adhesion. This was probably an old chronic case with a great deal of adhesions which had suddenly taken an acute turn, but on account of the adhesions completely walling in the affected area the newly-formed pus had not been absorbed, thus explaining the low total count.

Case C. Blood report: White blood count 7,000, polynuclears 82 per cent., eosinophiles, none found. Physical condition of patient showed a very low resistance; temperature up to 104°. Upon operation the appendix was found to be gangrenous and local peritonitis had set in.

One would naturally suppose that a high total with a very high relative count would be found; instead of this we have a low total and an almost normal polynuclear count. This is, of course, easily explained as soon as the condition (non-resistance) of the patient is taken into consideration. The polynuclears and the total counts will all be raised if the physical condition of the patient is such as to allow of a hyperleucocytosis. If there is no bodily resistance there will not be a hyper-production of leucocytes. The absence of eosinophiles is a very striking constant phenomenon which always occurs in septic cases. In fact, were I to find a patient with the aforementioned blood findings, especially if eosinophiles were totally absent, and there were definite symptoms with marked tenderness in the region of

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the appendix and an apparently poor general condition, I would very strongly suspect an acute sepsis. Many other cases could be cited at great length, but space does not permit.

The house surgeon of a hospital told me only a few weeks ago that he had lost all confidence in laboratory tests, and referred in particular to the blood findings of Case B which occurred in his hospital. If he had used the blood findings as they should be, that is, as a very important symptom and an aid to diagnosis, and not lost sight of the past history and the physical symptoms, he would not have been led astray.

This article has been written with the hope that the physician, and more particularly the surgeon, will familiarize himself with the various laboratory tests and employ them as a routine in all cases.

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10 Church St., Ossining, and Dobbs Ferry, N. Y.

DISPLACEMENT OF INTUBATION TUBE IN A CASE OF CATARRHAL LARYNGITIS REQUIRING TRACHEOTOMY.

By HENRY HEIMAN, M.D., New York.

I. D., male, aged seventeen months, was admitted during my summer service to the Children's Department of Dr. Koplik at Mt. Sinai Hospital, July 27, 1913, with the following history: Onset five days ago with the symptoms of catarrhal croup —spasmodic cough, slight fever and increasing dyspnea. On admission the child showed marked xyphoid and intercostal retraction at each inspiration with evidence of obstructed breathing. The general condition was poor, the child extremely restless, the respirations rapid and stertorous, with moderate cyanosis. No exudate was observed in the throat. Loud rales were heard over both sides of the chest. The pulse was rapid and feeble; the remainder of the physical examination was negative.

On the eve of admission intubation was attempted by one of the members of the staff to relieve the obstructed breathing. This was unsuccessful probably owing to the swelling of the mucous membrane. In view of the possibility of a foreign body in the upper respiratory tract, a bronchoscopy was performed by Dr. Yankauer. The result was negative with the exception of a slight subglottic edema. Subsequent fluoroscopic and radiographic examination failed to reveal any foreign body in the respiratory tract. The child was seen by me the following morning. Eliminating the possibility of a foreign body and of a primary diphtheritic laryngitis, the throat culture having been reported negative by the Board of Health and our laboratory, the case appeared to be one of ordinary catarrhal croup. An intubation was then performed with a smaller tube than the one previously employed. The usual immediate relief of symptoms followed. Three days afterward the child's condition had improved sufficiently to attempt extubation. On inserting my left index finger over the glottis I distinctly felt the retention swell of the tube. The extractor, passed along the palmar surface of the finger into the glottis, failed however for some reason to grasp the tube. On the reinsertion of my index finger to discover the cause of the failure, to my surprise the tube could no longer be felt. The probabilities immediately thought of were, first, the expulsion and subsequent swallowing of the tube, second the displacement of the tube into the trachea. A fluoroscopic examination showed the presence of the tube at the episternal notch pointing to the right. Inversion of the child and upward movement of the tube proved unsuccessful. The aid of the surgeon was sought, and the child was subjected to an immediate tracheotomy. It was found absolutely impossible to remove the tube through the tracheotomy wound, but by further upward manipulation it was extracted through the mouth. The retention swell of the tube had evidently been displaced into the ventricle of the larynx in the attempt at extubation. owing to the small size of the tube and to the recession of the swollen tissues. On thorough inspection no hemorrhage or traumatism was noted in the trachea. The child made an uneventful recovery and was discharged well 3½ weeks after admission to the hospital.

I have reported this case because of the occurrence of the displacement of the tube into the ventricle of the larynx in extubation. This accident usually occurs, if at all, during intubation. In subsequent cases then, bearing in mind this possibility. it might be wise before performing tracheotomy to make a small incision in the skin over the lower portion of the larynx, and attempt to remove the tube upward by manipulation only, without incising the trachea itself.

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Editorial Department

NEW YORK, SEPTEMBER, 1915

THE INTERNAL SECRETIONS AND THE SURGEON.

Our increasing knowledge of the work of the endocrinous glands and the intimate relation of their internal secretions to practically every phase of cellular activity may be of considerable practical advantage to the surgeon. The applicability of this information is by no means limited to any single phase of surgical practice; but just as the ramifications of the hormone threads in medicine are intertwined in such remotely connected conditions as growth, mentality, elimination, digestion and the emotions, so in surgery may these internal secretory influences be allied with such distantly related conditions as organic malformations, the repair of bone, certain joint diseases, the formation of new growths, surgical shock, and so forth. The physician who devotes all or part of his time to surgery will find a wealth of profitable information in the study of the internal secretory glands and their hormones.

Leaders in the profession are not slow to appreciate this. In conversation with a prominent orthopedist, we recently learned that he has studied the glands with internal secretions and their active principles with more than usual interest, for, as he remarked: "I find so many cases in my practice in which this clears up doubtful points and, more than that, enables me to give much more positive service than before I became especially interested in the subject." Still another surgeon—one of the greatest in the world—told us that he was "confident that these internal secretions were going to revolutionize surgery fully as much as they are now revolutionizing medicine."

While practically every internal secretory organ is of more or less direct interest to the surgeon, the adrenals seem to overshadow the rest in immediate importance; and to study the numerous reports in the literature of the past year, is to be convinced that the activities of these glands are of great significance in surgical practice.

It will be remembered that the adrenals exert a controlling influence upon the sympathetic nervous system, as well as upon the cardio-vascular tone. They are also very intimately related to the other endocrinous organs and are one of the principal factors in the maintenance of what is termed the "hormone balance." Hence adrenal insufficiency

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will be of more than passing interest, as upon it are dependent such important clinical manifestations as sympathetic irritability, cardiac exhaustion and hypotension, and the important syndrome, until recently overlooked, which is called "pluriglandular insufficiency." Crile's "kinetic theory" is an accomplished fact upon which is based a number of measures of tried therapeutic value; and the "kinetic system"—the brain, adrenals, thyroid, liver and muscles—is so intimately connected with surgery that upon it have been established the altogether profitable procedures of anoci-association, by means of which adrenal overexcitation and the resulting shock and collapse are minimized in a most satisfactory way.

The relation of the activity of the adrenals and their "chromaffin hormone" to the emotions—pain, rage, fear, etc.—is now known to be quite definite. Cannon has demonstrated this many times, and in his recent book, "Bodily Changes in Fear, Hunger, Pain and Rage," numerous convincing experiments are recorded which prove that these emotions cause an increased production of adrenin which may be, and very frequently is, so great as to produce adrenal exhaustion—the "acute hypoadrenia" first mentioned by Sajous and frequently referred to by him, Sergent, Martinet and other French investigators.

Quite recently Corbett (*Journal A. M. A.*, July 31, 1915) remarked that in his experience adrenin (epinephrin) exhaustion is an important factor in shock. This loss of the adrenal principle is not in itself shock. Rather adrenin is necessary to overcome the effects of shock, and any circumstance that reduces its production automatically favors the development of that condition. Symptoms fully develop only after the supply of adrenin is greatly reduced. The greater the adrenal depletion, the greater the extent and persistence of the shock. In fact the state of adrenal exhaustion may be considered as an index to the degree of shock. Among Corbett's conclusions is this statement: "Shock is a composite, in which epinephrin exhaustion and oligemia are predominant factors. Anesthesia, pain, fright and trauma are immediate agents in producing epinephrin exhaustion, as well as shock."

In this connection it is interesting to note that Stuver (*Amer. Medicine*, July, 1915, p. 575) reports favorable experiences with an adrenal solution (1:4000) containing ten grains of cocaine hydrochloride to the ounce, painted previous to the operation over the naso-pharyngeal mucosa as far back as the fauces. This, it is claimed, is an effective means of preventing post-anesthetic nausea, as well as shock, and is in line with the results reported by Delbet of Paris. He gives six minims of adrenalin 1:1000 hypodermically as a routine procedure before each operation. In over 1000 cases he found that the incidence of postoperative shock is practically nil.

The obvious practical deduction from the foregoing is to prevent hypoadrenia by all possible means and to supplement the work of the adrenals when necessary, thus forestalling many disasters and promoting a more salutary outcome in many surgical cases.

The importance of pluriglandular insufficiency—another phase of this many-sided subject—may be considered more fully in a later issue. In the meantime the relation of the internal secretory organs to the exigencies of surgical practice is of the utmost importance; and while justice cannot be done to so broad a subject in these few lines, it will be of advantage to emphasize the necessity of studying it more closely, and particularly the connection between the adrenals and postoperative complications.

PAUL EHRLICH.

The recent death of Professor Ehrlich at the comparatively early age of sixty-one is a great calamity to medical science. Probably he is best known to the rank and file of our profession as the creator of the wonderful side-chain theory, which is the basis of much of our knowledge of immunity; as the originator of the method of standardizing diphtheria antitoxin in common use in the biological laboratories, and as the discoverer of salvarsan. But this represents only a part of his achievements. By his discoveries of methods of staining bacteria, blood cells and other tissues he contributed materially to progress in bacteriology, hematology and pathology. His observations as to the selective affinity of various protozoal organisms for certain anilin dyes resulted in a series of ingenious and brilliant researches with a view of finding a specific substance which would be destructive to the trypanosoma of sleeping sickness. And it is to these investigations, which later were extended to the spirocheta of syphilis, that we owe atoxyl, salvarsan and neosalvarsan and the foundation of chemotherapy.

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Department of Railway Surgery
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PENNSYLVANIA RAILWAY SURGEONS' ASSOCIATION.*

President's Address—Lines East.

By G. L. ROMINE, M.D., Lambertville, N. J.

It is not my intention to burden you with a lengthy President's Address, because you have already listened to many good things.

What I shall say, however, is in relation to our society and I should like to make some suggestions bearing on its future.

The Pennsylvania Railway Surgeons' Association was organized at Reading, Pa., September 24, 1907. Here a committee was named which met at Harrisburg in March, 1908, where the Constitution and By-Laws were framed and later adopted at the first scientific meeting, held at Broad Street Station, Philadelphia, in November of 1908, with a membership of about 60.

Regular meetings have been held each year since.

It has been my pleasure, since the organization of this body, to attend every meeting, and I feel that the Association is anything but lagging in its work—in fact, a much greater amount of enthusiasm is shown each year.

The class of papers presented and discussed equals those of our best medical societies, besides being better suited to our special field.

Furthermore, I consider being a member of this Association a special privilege and equal to attending a post-graduate school, as it were, for we have had the pleasure of listening to papers from the best talent in this country, both medical and surgical, as well as to instructive contributions relating to the legal phase of our work.

I voice the sentiment of every member here, I believe, when I say that at each meeting some one paper which has been read and discussed has fully repaid us for attending these sessions; in fact, so valuable is the work done by this Association that I do not see how any surgeon of the lines, East or West, can afford to be absent from the meetings without missing the training needed to fulfill his duties to the best advantage of the Pennsylvania Railroad Company and himself. He is therefore not doing justice to his appointment, for never has there been a time when well trained surgeons were more needed for this work than at the present; neither has the company been so hampered by "fool laws" as now, not to mention more to come. Among them are the liability and other unjust claims imposed upon them by the unscrupulous public and their legal advisers.

To help the company to meet this imposition, how can the surgeon be better prepared for his duty than by attending our Association meetings, where he is taught the surgical, medical and legal sides of the work, and how to care better for each individual case and at the same time look after it in a manner that shall best serve the company's interest? If the Association is expected to prosper in the future it would seem that the Pennsylvania Railroad Company, for its own interest, should realize that in order to render the most efficient service, every surgeon should be a member of this society and should always be present at the meetings, or able to give a valid excuse for his absence, and that such a rule should be incorporated in the agreement between the company and its surgeons; for anyone who cannot rise to this is hardly the material to fill the requirements of the company.

Please do not feel, however, that membership in the Association is a mere ornament, for it is not; it involves more than that. It is a duty and responsibility for each member to be present, and if unable to read a paper, to add his experience to those who do, and thus help to keep up the interest in these meetings.

Remember the Japanese proverb: "The absent ones continue to get further away."

Our presence means much to those who are working hard to advance the interests of our Association, and once away, how easy to break the tie!

But I hope that this stage has been passed as far as this Association is concerned.

There is one other very important matter to which I wish to call your particular attention, and one which I feel should be spoken of in a forceful manner—and that is the prompt payment of dues.

As in all other organizations, money is always required for necessary expenses, and carelessness

* Read before the third joint meeting of the Railway Surgeons' Associations, Pennsylvania Lines East and West of Pittsburgh, June 19 and 20, 1914.

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in this respect on the part of the members makes it somewhat humiliating to the officers, besides imposing so much unnecessary work upon our treasurer.

We will now, when we look into the future, be a little more optimistic, for it promises a very bright aspect.

The Pennsylvania Railroad Company is already showing its appreciation of its surgeons' work by giving them its moral support, and by recognizing in them the same unselfish interest that has always characterized the physician and surgeon; that is, always forgetting his own personal comfort and very often his purse to benefit his fellow man.

I am very glad to say that I already have the assurance from an officer of the company who, seeing the effect for good of this Association and the effort that is being put forth to raise it to the highest plane for the achievement of greatest possible results, has stated that he will make every effort to induce the company to work hand in hand with the surgeons. This means that the surgeons have accomplished what they started out to do, their object being to form an association not only to advance the company's interests, but also to better prepare themselves for their duties, for which the Association should, I think, be congratulated.

DIRTY WOUNDS.*

By J. P. HETHERINGTON, M.D., Logansport, Ind.

In the preliminary announcement of this meeting, mention was made of nearly a hundred open wounds being treated with only one becoming infected. This is certainly a result for any surgeon to be proud of. It goes without saying that Dr. Garcia knew and did not neglect his business, but the question in my mind is whether the doctor was not as much responsible for the lack of infection as the iodin he used in the wounds. What I mean is this: We desire a standard method of treating wounds and here is a grand example of either avoiding or destroying infection. Now how much credit shall we give the iodin?

I am under the impression that soldiers are required to bathe occasionally. It was soldiers that were injured. Suppose it had been a lot of dirty laborers who had not had a bath for a month, would the result have been the same? I am not criticizing the germ destroying power of iodin. I am thinking of the condition of the wound before the iodin was used. Did he have macroscopically dirty wounds that were not seriously affected, or were they apparently clean but really dirty wounds with infection?

We have all had wounds brought to us with every prospect of a bitter fight that recovered nicely, and again trivial injuries resulting disastrously. I have in mind a knee-joint torn open, full of gravel and cinders, part of the articular surface broken off, yet resulting in practically a perfect recovery without infection. Then a mashed toe that was carefully amputated, followed by three months of constant care, with one abscess after another all over his body, in spite of the most careful cleansing, open drainage, and serum treatment, resulting in death. The one was a brakeman who had left the Y.M.C.A. bathtub but a short time before; the other an Albanian who had probably not thoroughly washed his feet in months.

Formerly when I used needle and thread as a routine in closing wounds I had constant trouble with infection. For over three years I have used the metal sutures, which hook into the skin and bridge over the wound, almost exclusively in the office routine, and it is astonishing how much less trouble I have had with infection. This started me to wondering where a large part of the infection possibly came from in apparently either clean or dirty wounds.

If a man comes in with a skin showing evidence of an occasional bath and with clean underclothes, if he has been injured out on the road where the dirt in his wounds is picked up on the right of way where it has had less opportunity to become infected, with plenty of air and sunshine to destroy the infective material dropped from passing trains, I believe his wounds have a much better chance of easy healing than the man who never takes a bath, or is injured in a shop where men have been spitting for years, with the resultant infective dust settling on his skin, waiting for a chance to slip under his scaly hide through a wound or abrasion.

I have often remarked that I believe it would be a good "safety first" idea to hang a blue lantern

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on every nasty spitter, like the inspectors do on cars, so that every one could avoid running into their filthy offal. Only a few days ago a young man came into the office with a chew of tobacco a fellow employee had tied on an injured finger. I told him that it is claimed that 60 per cent. of the men in this country are infected with syphilis and he could never tell what he was getting. The idea frightened him so much that he almost fainted. The only way you could get a nasty wad on his finger again would be to catch him asleep. That wounds heal after such a dressing is no harder to explain than why the fellow in a wreck was carried with the top of a car 92 feet by actual measurement without an external sign of injury.

Dirt from grease, coal, smoke, soot, cinders, gravel, etc., does not necessarily produce infection in wounds. I believe one of the most dangerous sources of infection in ordinary wounds is from the skin and its accumulations or coverings of unclean clothing.

When a man is injured, one of the first things he thinks of is washing the wound. Nine times out of ten, if he does, he will wash the dirt into it instead of away from it, thus making a surgically dirty out of an otherwise clean wound. So practically all first aid packages contain nothing but a covering to prevent more infection entering than is already in the wound, which is all right in itself. But the trouble I find is in getting the men contented with their first aid dressings. They want something more than a piece of gauze to put on. I can almost tell where the men come from by the dressing on the wound. The Pennsylvania shops will have gauze with phenol sodique; the Vandalia shops will have gauze with turpentine; the Pennsylvania yards usually nothing, because it is too far to the yard office. None of the Pennsylvania, Vandalia, Wabash nor Traction road men have a regulation way of dressing. Many use the first aid packet quite intelligently, but a chew of tobacco with the first aid gauze over it is still observed occasionally, though all have packets and instructions. The stone quarry commissary uses the packet well, but out in the quarry they are very liable to tie the cotton on with the gauze.

The gauze in the first aid packet is very liable to become dry and harsh, and rather than arbitrarily tell the men to put it on when they want something wet to apply, I think I get more satisfactory results by having those at the Pennsylvania shops wet the gauze with the old phenol in which they have confidence.

Regardless of the dressing a man has on when he is brought in, by the time the wound comes under my care all infection that could has reached it, consequently the greatest danger is in introducing more infection, especially from the skin.

My routine method is to keep the wound protected with gauze while I clean the skin as far around it as I think best, using gasoline to remove grease, or cleaning the surrounding skin according to circumstances.

I would be pleased to hear the advantages and disadvantages of various methods for cleaning the surface around the wound before removing the protective covering over it discussed. After the surrounding surface has been cleaned, being careful not to allow any dirt to get into the wound, I clean my own hands and am then ready to remove the gauze and care for the wound. After the wound itself and my hands are cleaned I paint the surrounding surface with iodin.

Local railroad surgeons seldom have the advantages of an operating room. Their work is done in the office or a private house without trained assistants. To give an injury proper attention at a hospital where trained help and all necessary conveniences are at command, is easy in comparison with the surgeon's work out in the country where he has to be nurse, bottle-washer and operator all at the same time, with frequently a host of the injured's relatives or friends kindly suggesting the proper course to pursue.

A careful discussion will bring out very many valuable points that will interest most of those present and assist in standardizing the method of procedure in ordinary cases of injury, so I have written what I hope is only enough to introduce the subject.

Having no routine method of caring for the injury itself, but usually considering all railroad wounds as primarily infected, I leave the subject of dirty infected wounds for treatment in the next paper.

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TREATMENT OF SUPPURATING WOUNDS.*

By D. K. BRIGGS, M.D., Blackville, S. C.

Quite a large number of the injuries that we see come to us already infected and will suppurate, particularly those where there has been loss of large areas of skin, and in burns of the second and third degree there is always considerable suppuration, and as the tendency of all surgical methods is towards simplification, this is my excuse for bringing to your attention a very simple method that has given satisfaction to me.

That the treatment of suppurating and granulating wounds is not entirely satisfactory is evidenced by the large number of ointments, dusting powders and liquid antiseptics advertised in the medical journals. Ointments only do good by being emollient; but no greasy base being able to mix with the secretions of the wound, they tend to retain and increase rather than diminish the discharge. Dusting powders offer the same objection, and unless the abraded surface is very superficial so that they completely dry the wound they do more harm than good. Wet dressings, even alcohol, cannot be used for a long time on account of the edges of the wound becoming macerated by the watery dressing retarding epithelial growth, and if the area is extensive, as it sometimes is in large burns, the extraction of bodily heat is a factor to be considered.

In a recent editorial in *Journal A. M. A.*,[1] discussing "War experiences with infected wounds," is mentioned the use of a five per cent. solution of common salt, combined with 0.5 per cent. solution of sodium citrate, and that this method produces a very free flow from the wound so much so that the limb must be wrapped in water proof dressing. It goes on to state that this method is practically a reversion to the old one of "drawing something out;" further on it says that up to the present time experience has not furnished anything in confirmation of the idea that the introduction of antiseptics into the wound would be likely to contribute to the arrest of suppuration.

Dr. J. C. Bloodgood,[2] of Baltimore, Md., in a review of wound dressing, says:

"That the chief thing common to all successful treatment is prevention of secondary infection, frequent dressing, and the absence of irritating drugs, and that the fault in healing of the granulating wound is not of the epithelium but of the granulating tissue; this granulating tissue must be kept clean, and its circulation maintained."

A dressing for large suppurating wounds should possess the following qualifications:

It should be non-toxic.

Non-irritant—should stimulate granulation and growth of epithelium.

Should lessen discharge, and enable the old dressing to be easily removed without injury to the granulations and with a minimum of pain to the patient.

It should be as nearly odorless as possible, and it must be inexpensive.

Fulfilling all of the above requirements is dehydrated glycerine, that is, the ordinary commercial glycerine heated to a boiling point to deprive it of water that it has absorbed, commercial glycerine contains considerable water. Glycerine is chemically propenyl alcohol; boiling at 554° F.; therefore, simple boiling renders it sterile. The action of glycerine is purely mechanical; it is not an antiseptic, but owing to its density it has an inhibitory action on all germs and is non-fermentative; it is a powerful solvent and mixes freely with all secretions that come from the wound. whether it be blood, serum or pus. Owing to its osmotic action it extracts the serum from the infiltrated area and from the granulating tissue. thereby keeping up a constant hyperemia, which lessens necrosis and hastens the separation of tissues that are already necrotic. It also stimulates the formation of epithelium, there being no keratosis of the edges of the wound.

Dr. A. E. Hoag,[3] of New York City, advocates the use of Durante's solution which is one part iodin, 10 parts iodide of potash and 5 parts guaiacol, in 100 parts glycerine. I have used this, but do not see any advantage over plain glycerine. Carbolic acid should never be used with glycerine, and should it be necessary to use it to cause the destruction of necrotic tissue it should be applied full strength, then its action stopped with alcohol, and the glycerine dressing applied. The application of glycerine, while simple, necessitates the following method:

* Read at twentieth annual meeting of Association of Surgeons of Southern Railway, Asheville, N. C., June 2-4, 1915.

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If there is any depth to the wound it can be simply poured into it, but if there is a flat surface the glycerine must be applied on at least four thicknesses of gauze, and the dry dressing applied over it. This dressing must be sufficient to absorb all the secretions until its renewal. The secretion is quite free for the first few days, but rapidly diminishes in amount.

There is nothing more striking than the change which takes place in a large granulating wound after dressing with glycerine for a few days, from a pale pink the granulations, bathed in pus, assume a rosy red and with very little secretion.

The *Journal A. M. A.*,[4] in its Paris letter of April 29, 1915, says: "Since dressing of sterile gauze has the advantage of adhering to wounds and of being difficult to detach, it has occurred to M. A. Lumiere of Lyons to use compresses of tulle with a mesh of 2 mm. These compresses separated from each other by paper are sterilized by heat for an hour, in a mixture composed of petrolatum, wax, castor oil and balsam Peru. Thus prepared they do not adhere to the wounds, while the secretions pass through the meshes of the tulle and are absorbed by the wadding of the dressing." All of this trouble is obviated by the glycerine dressing, for after its use, owing to its power of absorbing moisture and its slow drying qualities, even if several days elapse between the dressings it does not adhere to the wound.

REFERENCES:

1. Journal A. M. A., May 22, 1915.
2. Progressive Medicine, Dec., 1914.
3. N. Y. Medical Journal, Jan. 17, 1914.
4. Journal A. M. A., May 22, 1915.

Early Recognition of Cancer of the Stomach.—Dr. J. Friedenwald (*N. Y. State Jour. of Med.*, July; 1915) says that inasmuch as our means of early diagnosis of cancer of the stomach are exceedingly insufficient, and until more certain methods of diagnosis are available, exploratory incisions should be urged upon all individuals over forty years of age having gastric symptoms which are not relieved after a few weeks of treatment, especially is this the case if the patient presents a history of rather abrupt onset, some loss of flesh, an absence of free hydrochloric acid in the gastric contents, and occult blood in the stools. Even under those conditions many cases will be operated on too late, for there can be no question but that gastric cancer may be present for some time and may assume considerable proportions even before marked symptoms of indigestion are manifested.

ASSOCIATION OF SURGEONS OF SEABOARD AIR LINE R. R.

Annual Meeting Held at Wrightsville Beach, N. C.

MONDAY, AUGUST 16, 1915.

The Association met in the Convention Hall of the Seashore Hotel at Wrightsville Beach at 5 p. m. It was called to order by Surgeon W. H. McPhaul, of Lumberton, N. C., Chairman of the Committee of Arrangements. Invocation was offered by Rev. F. Denton. Addresses of welcome were delivered by Mayor P. Q. Moore in behalf of the city of Wilmington, and by Dr. W. C. Galloway of Wilmington, N. C., in behalf of the medical profession of the city. Surgeon Jack Halton, of Sarasota, Fla., responded to the address of welcome. These addresses will appear in the Transactions.

At this hour, after the reading of the following resolutions, the meeting adjourned until 10 o'clock Tuesday morning:

Resolution in memory of Dr. Harper:

"Whereas, The Association of Seaboard Air Line Railway Surgeons having heard of the sudden and unexpected death of one of its beloved members, after an operation for appendicitis, Dr. Charles T. Harper, of Wilmington, N. C.

"And whereas, Dr. Harper in devoting himself to the specialty in surgery, had acquired a great reputation, having a private hospital for his own patients, his success being such that only a short time ago, the original hospital was enlarged for the benefit of his patients and increasing work.

"Dr. Harper was a lovable and strong man, and was always willing to bear the infirmities of the weak and lowly. His genial personality and bright disposition endeared him to all who had the pleasure of his acquaintance, and enabled him to bring hope and cheer to the weak, afflicted and faltering.

"Among the profession he was universally popular and it must be that his death was a great shock and an inestimable loss to them.

"Resolved, therefore, That this Association feelingly regrets the death of Dr. Harper, who had labored so hard and unceasingly to promote the general good and progress of the Association, and that as he rests from his labor, his works do follow him.

"Resolved, further, That a copy of this preamble and resolution be published in the daily papers in Wilmington, recorded in the minutes of the Association and sent to the family of our deceased brother.

"As a further mark of respect to the memory of Dr. Harper, that the Association adjourn until tomorrow morning at 10 o'clock."

Resolution in memory of Dr. Caldwell:

"Whereas, The Association of Seaboard Air Line Surgeons, having heard with profound sorrow of the untimely death of one of its old and respected members, Dr. Morris M. Caldwell, local surgeon at Wilmington, N. C., and

"Whereas, Everyone who had the pleasure of meeting him was aware of his gentle nature, his cultured and courtly bearing, and that he died as he had lived, sacrificing himself for the good of humanity. In his daily walks of life, he always looked for the bright and good side of every person, and in all 'charity,' he overlooked any shortcoming in his fellowmen. He lived the life of a good physician, in being ever ready to respond to an appeal of poverty and distress and his

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acquiescence to a worthy cause, was as glorious as it was without ostentation. He was inspired with the highest ideals and the community in which he lived was the better for his example.

"Resolved, That the Association of Seaboard Air Line Railway Surgeons deeply deplore the death of our co-worker, Dr. Morris M. Caldwell, of Wilmington, N. C., and his memory will ever be cherished by us all.

"That a copy of this preamble and resolution be published in the daily papers in Wilmington, recorded in the minutes of the Association and sent to the family of Dr. Caldwell.

"Resolved, That as a further mark of respect to his memory that this association adjourn until to-morrow morning at 10 o'clock."

Monday night, at 9 o'clock, the annual banquet, given the surgeons by the Seaboard Air Line Railway, took place in the dining room of the Seashore Hotel. Chief Surgeon Jos. M. Burke acted as toastmaster. Addresses were made by Hon. John D. Bellamy, Local Counsel for the Seaboard; Mr. A. B. Skelding, General Manager of the Tidewater Power Co. of Wilmington; Mayor P. Q. Moore, Judge Hines, and others.

MENU.

Oyster Cocktail
Green Turtle Clear

Broiled Spanish Mackerel
Pommes Juliene
Olives Gherkins

Soft Shell Crabs on Toast
Clam Fritters
Chilled Tomatoes Iced Cucumbers

Deviled Crabs in Cases
Shrimps Potato Salad
Mayonnaise Dressing

St. Juliene Punch

Corn Muffins Tea Biscuit
Wafers Coffee
Cheese

Cigarettes Nurica Cigars

TUESDAY, AUGUST 17.

MORNING SESSION, 10 A. M.

The meeting was called to order at 10 o'clock by Dr. W. A. McPhaul, of Lumberton, and invocation was made by Rev. Dr. A. D. McClure, pastor of St. Andrew's Presbyterian Church, Wilmington. Surgeon M. L. Wood, president of the organization, opened the session proper by delivering his annual address, in which he expressed his appreciation for the honor and trust that had been placed upon him, outlined the exacting duties of an efficient railroad surgeon and made a review of the progress of the work and organization within recent years. His address was not only very much enjoyed, but will prove a strong moral support to many of the surgeons in their daily practice. It will be printed in the Transactions.

After the President's address, a resolution was read in honor of this being the tenth year in which Dr. Burke has been Chief Surgeon of the Seaboard. This resolution of appreciation was spread on the minutes of the Association, and is as follows:

"After a happy stewardship of ten successful years as Chief Surgeon of the Seaboard Air Line Railway, we feel constrained to record our recognition of the efficient and painstaking manner in which Dr. Joseph M. Burke has built up the surgical service of the Seaboard Air Line Railway through remarkable executive methods, pleasing and magnetic personality, keen perception of the duties and details of his exacting office and his personal effective co-operation with the individual surgeons.

"Furthermore, we, the members of the Seaboard Air Line Railway Surgeons' Association, in fourteenth annual convention assembled, do hereby express our pleasure and appreciation of serving under such a leader, through whose commandership and efforts, has developed our organization to its present high standard and efficiency."

Dr. J. F. Huey, of Alton, Ala., Chairman of Lapel Button Committee, reported, and the convention settled on a design. These buttons can be obtained from Dr. Frank C. Lewis, Editor of the INTERNATIONAL JOURNAL OF SURGERY, who took the matter in hand to see for what he could have the buttons made. The Executive Committee reported and presented the following names for membership to the Association, which were unanimously elected:

New Members: H. P. Newman, Barlow, Fla.; K. P. Battle, W. Raleigh, N. C.; Joseph Akerman, Wilmington, N. C.; Chas. H. Pugh, Stanley, N. C.; Clifton M. Mills, Richmond, Va.; B. R. Tucker, Richmond, Va.; H. H. Bass, Henderson, N. C.; Jno. C. Wessell, Wilmington, N. C.

The Secretary and Treasurer, Surgeon J. W. Palmer, Ailey, Ga., made the following report:

The Seaboard now has about 207 surgeons, not including those of the last railroad purchased by the Seaboard. Of this number 165 are members of the Association.

My financial report, given below, shows balance of $252.95 in the treasury, prior to this meeting; however, the 1914-15 Transactions have not been paid for. I have some trouble in collecting dues. There are $220.00 now due by members in arrears. According to the By-Laws, when a member fails to pay his dues for two consecutive years, I have to drop his name from the roll until all back dues are paid up. This is forcing me to drop several members. You who are careless about your dues should pay more promptly, because each year you

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get the JOURNAL free and a copy of the Transactions, all of which would cost you $2.50.

Now, if you fail to receive the JOURNAL regularly, please notify Dr. Frank C. Lewis, who will see personally that it reaches you safely and regularly.

Resolution, adopted at the August, 1915, session of the Association of Seaboard Air Line Railway Surgeons, urging all surgeons of the Seaboard system to become members of the Association:

Wrightsville Beach, N. C., Aug. 20, 1915.

Whereas, The members of the Association of Seaboard Air Line Railway Surgeons receive great benefit, acquire information of professional interest to themselves, and learn that the Seaboard is dealing only on a fair and honest basis with those who are unfortunately injured in the progress of the world's business, and that safety should be first; and

Whereas, From attendance on the annual meetings of the Association, besides the pleasure of social and entertainment features, there is much to be gained and acquired by the members mingling with one another and meeting personally our Chief Surgeon and other Seaboard officials, reading scientific railway papers, hearing and entering into discussions of papers read before the conventions, all of which make the members better Seaboard surgeons and better physicians and citizens for general practice; therefore, be it

Resolved, By the Association of Seaboard Air Line Railway Surgeons, now in convention assembled, that it is the sense of this body that each and every Seaboard Air Line surgeon should become a member of said Association.

Resolved, further, That we request our Chief Surgeon, Dr. Joseph M. Burke, to require each and every surgeon of the Seaboard to become a member of this Association and maintain membership in same.

Resolved, further, That the Secretary furnish each surgeon who is not a member, also the delinquent members, with a copy of this resolution.

R. L. HARRIS, President,
J. W. PALMER, Secretary.

PAPERS.

Surgeon B. G. Allen, Henderson, N. C., read a paper entitled "How the Company Surgeon Can Help to Create a Better Feeling between the People and the Railroad." The discussion was opened by Surgeon S. T. Ross, Winder, Ga., and continued by other surgeons, and closed by Surgeon Allen.

"The Causes of Cancer and Delayed Recoveries" was the title of a paper read and handled in an able manner by Surgeon H. D. Stewart, Monroe, N. C. The discussion was opened by Surgeon T. J. McArthur, Cordele, Ga., and continued by several other surgeons, being closed by essayist.

Surgeon E. P. Lacey, of Bessemer, Ala., read a valuable paper from the standpoint of railway surgery, entitled "Traumatic Injuries of the Brain." This was extensively discussed by various surgeons, after which Surgeon Lacey closed.

"Treatment of Tetanus" was the title of a paper read by Surgeon L. S. Oppenheimer, of Tampa, Fla. The importance of this paper was demonstrated by the lively discussion. Surgeon R. B. Epting, of Greenwood, S. C., opened the discussion, which was continued by a great many surgeons, including Dr. Frank C. Lewis, of New York, who gave an interesting account of the prophylactic treatment administered to himself. Surgeon Oppenheimer closed the discussion.

A paper in which both the railroads and general public are vitally interested was the one read by Surgeon Frank L. Eskridge, Atlanta, Ga., entitled "The Relation of the Modern Style Dress to Female Diseases and its Interest to Railroad Surgeons." The paper was discussed from different phases by many surgeons and closed by Surgeon Eskridge.

"Hernia," the subject of a paper read by Surgeon J. G. Dean, of Dawson, Ga., was one of the most important papers read at the convention. The discussions were very extensive, some of the members bringing out the point that the railroads unjustly paid large sums for hernias which were acquired long before the individuals became employees of railroads, or received injuries.

"Infantile Gastro-Intestinal Disorders" was the title of a timely paper read by Surgeon T. E. McBride, Rockmart, Ga. The discussion was opened by Surgeon A. B. Crooms, Maxton, N. C., and continued by other surgeons, and closed by the essayist.

"Injuries of the Eighth and Ninth Dorsal Vertebræ" was the title of a very important paper, especially from a railway standpoint, read by Surgeon H. A. Burke, Petersburg, Va., and discussed in general by the convention.

Surgeon Oren Moore, Charlotte, N. C., read a paper entitled "Resection of Clavicle."

Surgeon Samuel B. Little, Colbert, Ga., read a paper, reporting two very interesting cases, which were discussed from all phases by a large number of surgeons.

The Prize Committee, which was appointed by the President to award the four prizes offered by THE INTERNATIONAL JOURNAL OF SURGERY, are Surgeons B. R. Tucker and Clifton M. Miller of Richmond, Va., and B. J. Witherspoon of Charlotte, N. C. The winners will be announced in the next issue of the JOURNAL.

The meeting adjourned.

At 9 p. m., Tuesday, the surgeons and their ladies were tendered a grand ball at Lumina Park.

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WEDNESDAY—BOAT TRIP.

The boat trip proved one of the most delightful features in connection with the convention and was enjoyed by a large number of the surgeons and members of their families. The party left the Seashore Hotel, where the convention was held, at 8.15 o'clock in the morning, arriving in time to leave on the steamer "Wilmington" at 9 o'clock. Lunch was served aboard.

The novelty of having the morning session on the boat was greatly appreciated. The Tidewater Power Company provided special cars for the surgeons and their friends to make close connections with the steamer "Wilmington" in its usual trip. A special feature of the trip was the Surgeons' lunch which was enjoyed by all. Practically all the actual business had been finished and only a few papers were read and discussed on the boat.

A handsome diamond scarf pin was presented to Chief Surgeon Joseph M. Burke, of Petersburg, Va., as a token of the splendid work he has done during the ten years he has acted in the capacity of the leader and friend of the Seaboard surgeons. A pair of solid gold cuff links were presented to Dr. J. W. Palmer, of Ailey, Ga., who has been the Secretary during the entire fourteen years that the Association has been in existence. The presentation speech in behalf of the Association for both presents was made by Dr. L. J. Picot, of Littleton, N. C. Dr. Picot is a speaker of fine bearing and delighted the members present by so effectively expressing the hearty good feeling that exists among them toward the recipients of the presents.

The election of officers resulted as follows:

President—Dr. R. L. Harris, Jacksonville, Fla.

First Vice-president—Dr. Frank L. Eskridge, Atlanta, Ga.

Second Vice-president—Dr. W. A. McPhaul, Lumberton.

Third Vice-president—Dr. L. J. Picot, Raleigh.

Secretary and Treasurer—Dr. J. W. Palmer, Ailey, Ga. (re-elected).

Member of Executive Committee—Dr. R. B. Epting, Greenwood, S. C. (re-elected).

Savannah, Ga., made a strong effort to land the 1916 convention, but Jacksonville won when the vote was taken.

Claims Attorney, Mr. W. L. Stanley; President, Mr. W. J. Harahan; Vice-president, Mr. Chas. R. Capp; Assistant to the President, Mr. W. L. Seddon, and General Superintendent, Mr. C. S. Lake, all of the Seaboard Air Line Railway, who were expected to address the surgeons to-day, could not be present, as they were unavoidably detained, very much to the regret of all the surgeons.

A resolution of thanks was voted to the Seaboard Air Line officials, to Drs. Joseph Ackerman and J. C. Wessell, of Wilmington, and W. A. McPhaul, of Lumberton, for efficient service and entertainment; to Mr. A. B. Skelding, general manager of the Tidewater Power Company, for efficiency in transportation service; to Mr. Henry Whyte, local Seaboard agent, for his valuable assistance, and especially to the Seaboard road for the transportation service, and to Mr. H. A. Webber, who had charge of the lunch on board the "Wilmington."

J. W. PALMER,
Secretary and Treasurer.

PENNSYLVANIA RAILWAY SURGEONS' ASSOCIATION.

We are in receipt of the following from Dr. J. D. McCann, Secretary of Lines West:

Dear Doctor:

It becomes my pleasant duty to inform you that the railroad surgeons "West" will meet with those "East" at Hotel Martinique, New York City, Monday, Tuesday and Wednesday, October 18, 19 and 20.

Dr. Colcord, Secretary of the Association "East," informs me that this is to be the banner meeting of all time. The New York and New England Society will hold their meeting the latter part of the same week and they are planning a joint smoker and glad time for all.

Those fellows down East don't know any better than to go their full length when it comes to organizing a "sure thing," as some of us learned last year at Atlantic City. We learned in our meeting last year that in six months' time, from June to December, inclusive, there was enough time lost to the railroad company by reason of accidental disability to amount to 464 years' time for one man. If we, by our clever surgical work and antiseptic precautions can get our patients back to work a few days sooner, can't you see what it will mean to the railroad company?

There are over 500 of us, Doctor, and if we are not interested in our Company's welfare enough to work for their interest we had better give up our jobs.

Last year our share of the expense was $75.00, this year it may be more. It will be best for each surgeon to pay $2.00, as did most of them last year, that we may not feel handicapped in our work.

If you care to send it before the meeting you will receive proper credit. Last year we of the "West" received two of the prizes offered for the best papers. Send me title, Doctor, of the paper you will read and prepare it with a prize in view. "Safety First" and "Do it Now" are good mottoes.

Remember date and place, October 18, 19 and 20, Hotel Martinique, New York City. Ask your Superintendent for transportation in good time.

J. D. McCANN, M.D.,
Secretary Lines West.

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Book Notice

Cystoscopy and Urethroscopy for General Practitioners. By Bransford Lewis, M.D., and Ernest G. Mark, M.D. Philadelphia: P. Blakiston's Sons & Co.

This book of Drs. Lewis and Mark shows a large amount of work upon the part of both surgeons to present a difficult subject in such a manner that it is not only interesting but instructive. This book should prove very useful to the general practitioner. Each author portrays his own contribution so clearly that it seems simplicity itself, yet there is no branch of surgery that is surrounded with so many difficulties as cystoscopy and urethroscopy. Both require much experience and unusual dexterity to accomplish the best results. These features must not be overlooked, as the novice otherwise may be led to consider the technic so simple that he will not devote the proper amount of time to gain the necessary experience and dexterity and will blame the instruments or technic for his failure. That portion of the book by Dr. Lewis upon cystoscopy is exceedingly well written and profusely illustrated with original cuts, which enhance the value of the text. His chapter on ureteral catheterization with illustrations is particularly fine. No one has had greater experience in operative cystoscopy than Dr. Lewis; therefore the chapter on this subject is of the greatest value. The author shows that intravesical operating is the method of choice and other procedures are to be employed only after failure with the former.

Dr. Mark's portion of the book upon urethroscopy is well written, interesting and exceedingly serviceable, as so little has been written upon this subject. He not only demonstrates the methods of examination of the normal urethra, but clearly shows the ease with which the diagnosis may be made in pathologic urethras. His ideas regarding the therapeutic value of urethroscopy are scientific and will prove instructive.

While fully cognizant of the scientific work of the authors, we regret exceedingly that more attention has not been given to the pathology, a subject which would increase the value of the work and could be well presented by them.

This book should be studied not only by the general practitioner but by the urologist as well, for there are many features which will interest both of these groups of workers. Urology certainly has been given a decided advancement by the publication of this work. L. W. B.

Surgical Gleanings

Disturbances Following Extirpation of the Gallbladder.—Drs. Graff and Weinert (*Beitr. z. Klin. Chirurg.*) endeavor to answer the question why disturbances so frequently remain after cholecystectomy. On investigating the subsequent history of 120 patients on whom this operation had been performed (among a total of 130 cases), they found that 87 were free from all disorders; 4 had a single attack after operation, but had experienced no further discomfort for four to six years; in 4 cases the existing disturbances were due perhaps to an unremoved gallstone, in 8 to involvement of the gastrointestinal tract and in 12 to adhesions. Four patients had an abdominal hernia and 6 suffered from general nervous troubles. Adhesions were therefore the chief cause of disturbances and to prevent these the authors advise subserous removal of the gallbladder, the covering in of its site with peritoneum, restriction in tamponade, and early operation.

Hernia in the Chronic Insane.—Dr. J. Allen Jackson (*N. Y. Med. Jour.*, July 31, 1915) summarizes his observations in the Philadelphia Hospital for the Insane as follows: 1. From five to six per cent. of the male chronic insane have hernia, usually inguinal. 2. Hernia rarely develops after admission to the hospital. Hernia does not develop in the insane during excitement or as a result of confinement and physical degeneration. 3. Palliative treatment consists of careful examination by physicians and trained attendants. 4. Trusses may be used in a selected class of cases; the absence of trusses, however, does not aggravate the condition nor increase the tendency to strangulation. 5. Operations are not necessary, except in the case of strangulation or for physical comfort. 6. Strangulation in an infrequent complication.

Resection of the Stomach.—Professor H. von Haberer (*Arch. f. Klin. Chirurg.*, Bd. 106, Hft. 3) has performed 183 resections of the stomach, 60 for carcinoma and 123 for ulcer. In 54 of the 60 cases of cancer the stomach alone was resected with an operative mortality of 22 per cent., 5 patients surviving four to nine and one-half years. In 6 cases a gastro-colic resection was done with 5 operative deaths. Of the 123 cases of ulcer 8 died after the modified Billroth operation and 3 after transverse resection. There were 66 cases in which the later results could be determined, and of these 51 were in complete health three months to four

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years after operation. Resection is particularly indicated for cancer and even in apparently inoperable cases permanent results are occasionally obtained. The only contraindications are demonstrable metastases in other organs, multiple peritoneal metastases, and infiltrating growths involving the entire organ. Large size of the tumor, adhesions, local glandular metastases, even of glands in the pancreas, if removable, do not constitute positive contraindications. For cancer the method of Billroth II is the most rational. Both this method and transverse resection are vastly superior to gastroenterostomy in the treatment of gastric ulcer.

Operative Treatment of Epilepsy.—Dr. Weissphennig (*Beitr. z. Klin. Chirurg.*, Bd. 92) gives some statistics which demonstrate anew how little can be accomplished by surgery in the treatment of epilepsy. Of 31 cases of genuine epilepsy only 3 were cured, 5 improved, 13 unimproved and 2 died after operation; in 5 cases the period of observation was too short to determine the result and in 3 no later examination was made. Trephining was employed 33 times in 29 cases, associated 26 times with excision of the dura. In 2 cases the vertebral artery was ligated (no improvement) and in one the superior cervical ganglion was excised (improved). Of 11 cases of traumatic epilepsy only one was cured and another improved.

Tumors of the Hypophysis.—Dr. F. Schepelmann (*Deut. Zeitsch. f. Chirurg.*, Bd. 133, Hft. 4) considers the intracranial methods as difficult technically as well as dangerous, and only indicated in cases where the growth of the tumor is upward toward the cerebrum. On the other hand, in the more frequent cases of intra-sellar development and cyst formation the trans-sphenoidal methods are to be preferred, even when they do not permit of radical removal of the tumor. The diagnosis can almost always be made from the enlargement of the sella turcica in the Roentgenogram. Operative intervention is indicated in the presence of signs of intracranial pressure, decrease of sight, the frequently unbearable headache, and disturbances of growth and in the metabolism.

Metastases After Furuncles. — According to Professor Riedel's experience (*Deutsche med. Wochensch.*, No. 4 and 5, 1915), dangerous and even fatal conditions may result from furuncles or osteal panaritia by direct extension of the infection to the veins. This gives rise to a purulent thrombophlebitis or to metastatic abscesses either in the immediate vicinity of the primary site of the disease or at a remote place. These metastases usually develop very slowly, after weeks or even months, so that often their connection with the furuncle or purulent process seems doubtful. In 54 cases observed by Riedel the metastasis usually followed furuncles, more rarely carbuncles, quite often osteal panaritium, with 13 deaths. Osteal foci (osteomyelitis of various bones) were observed in 14 cases; eight were young persons up to twenty-five years, of whom three died. Metastases in the soft parts were seen almost exclusively in adults (40 cases). They may occur in the brain, a favorite site, in the muscles, especially in the perirenal tissues and occasionally in the kidneys. Riedel has also found metastatic abscesses in the lungs, thyroid gland, thymus gland, in the eye, subacromial, prepatellar and trochanteric bursæ; in fact, in the most varied locations. In the treatment of furuncles he advises conservative measures (poultices, ointments). Superficial pustules as in acne usually heal spontaneously. If they enlarge and become more sensitive, all that is necessary is to remove the skin overlying the core with the knife held flat and to apply a piece of gauze smeared thickly with an ointment. If there is more marked infiltration and pain, a crucial incision splitting the core in four parts is indicated, the wound not being tamponed. The incision is rendered completely painless by an ether spray, but to make this effective the blood supply to the affected part must be cut off or greatly restricted by rubber bandages or circular compression of the periphery of the furuncle until the tissues become white. A dressing of dry gauze and cotton is applied after incision, which is replaced by an ointment on the following day (avoiding vaseline). Furuncles in the deeper cutaneous tissues must be at once operated on, carbuncles being extirpated under a general anesthetic.

Conservative Treatment of Enlarged Glands of the Neck.—Dr. L. B. Meyer (*Med. Rec.*, July 10, 1915) says that we all see any number of cases in which there is present either a number of small deforming scars in the neck (the legacy of ruptured or incised gland abscesses) or a large scar due to the more or less complete removal of cervical glands. Frequently under the scar evidence is present of a recurrence of the condition, or what is more probable, of incomplete removal. Most important, however, is the fact that in a very large number of these cases a careful examination of the mouth and nasopharynx reveals enlarged, diseased tonsils or adenoids, or decayed teeth, or all three conditions, evidence of the fact that effects only were treated while the cause was neglected. In his opinion no case of enlarged glands of the neck (tuberculous or otherwise, and in a large percentage of cases a differential diagnosis is impossible without the removal of a specimen) should be operated upon radically, without at the same time, or better previously, correcting all pathological conditions in the mouth and nasopharynx which might act as a source of infection. Unless this procedure is followed, the subject of a thoroughly radical operation is theoretically left without protection against systemic invasion by a cause still active, and if the operation is less radical and only the enlarged and most superficial glands are removed, the remaining glands will almost surely become infected by the original causative agent. The patient is thus worse off than if he had had no operation at all.

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THE INTERNATIONAL
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Original Articles

DISEASES OF THE NOSE, THROAT AND EAR FROM THE PRACTITIONER'S VIEWPOINT.

By JAMES JOSEPH KING, A.B., M.D., New York.

Attending Laryngologist, Hospital for Ruptured and Crippled; Chief-of-Clinic, Ear, Nose and Throat, Gouverneur Hospital; Clinical Assistant in Otology, New York Eye and Ear Infirmary.

(*Continued from July Issue.*)

ADENOIDS (PHARYNGEAL TONSIL).

Definition; Synonyms; Etiology; Pathology; Symptoms; Prognosis; Treatment; Operation.

Adenoids are hypertrophied lymph glands which normally exist in the epipharynx or naso-pharynx. They are chiefly located on the superior and posterior walls of the upper naso-pharynx. They sometimes extend into the fossæ of Rosenmüller and to the mouths of the Eustachian tubes. The anatomy and histology of adenoids are the same as those of the faucial tonsils which will be described subsequently. Adenoid vegetations, pharyngeal tonsils, and epipharyngeal tonsils are synonymous terms.

Etiology. Adenoids affect persons of all ages, but are most common between the ages of three and fifteen years. It has been estimated that adenoids are present in a pathological sense in from one to nine per cent. of all children and in 50 to 73 per cent. of all cases of deaf mutism. The adenoid or lymphoid tissue is normally present in all children from birth to puberty, at which time it sometimes undergoes degeneration and disappears. Adenoids often persist, however, into adult life. While they are subject to most of the pathological changes that take place in the faucial tonsils and produce a train of symptoms which are well known, they are sometimes present with few or no symptoms. Climate has little influence upon the formation of adenoids, but it may be said that they are more liable to develop in cold damp climates, possibly due to the constant irritation of the pharynx and naso-pharynx. There seems to be little racial preference. It has been believed that the negro is rarely affected, but the

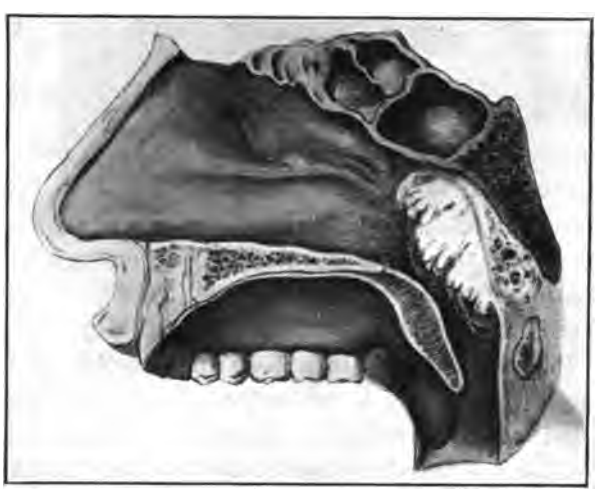


Fig. 27. Antero-posterior section of an adult head, showing the situation and gross structure of adenoid or hypertrophied lymphoid tissue of the nasopharynx (Zuckerkandl).

writer has frequently found them in patients of this race.

Although adenoids are not hereditary, they are frequently encountered in several members of the same family. This is not due to hereditary tendencies, but is probably because members of the same family are subjected to the same environment.

The formation of adenoids is favored by the use of "comforters" which mothers allow their babies to suck constantly, this constant suction producing irritation of the pharyngeal mucosa. These "comforters" are unhygienic and unsightly. The practice of sucking the thumb is objectionable on the same grounds. It is believed that bottle fed infants who are allowed to nurse their bottles almost constantly, and even to keep the

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nipple in the mouth while sleeping, are more prone to the development of adenoids than are breast-fed infants.

The most important etiological factor of adenoids is an acute exanthematous fever. It is well



Fig. 28. This specimen shows the several lobes of a large adenoid removed from a girl of 9 years.

known that the lymphoid structures of children are especially liable to enlargement under bacterial stimulation. During attacks of these diseases the lymphoid tissues of the pharynx and naso-pharynx are constantly irritated by bacterial invasion, with resulting hypertrophy.

Pathology. The pathology of adenoids is so important that it is advisable to state it somewhat comprehensively. According to McBride and Turner, the pharyngeal tonsil is a peripherally placed lymphatic gland from which efferent ducts



a b

Fig. 29. Two adenoids: (a) shows the free surface and lobes; (b) the posterior surface or base with capule; also a bloodvessel in the center undergoing fibrous sclerosis. Removed from brother and sister, ages 6 and 8 years.

pass to the nearest glands in the cervical chain. Their chief distribution is on the upper and posterior walls of the naso-pharynx. Moreover, it extends to the fossæ of Rosenmüller, and the accompanying inflammation invades even the Eustachian tubes in 66 per cent. of the cases.

The adenoid masses are sessile, with uneven granular or lobulated surfaces. Histologically, the growths are composed of hyperplastic lymphoid tissue in which the quantity and density of the reticulum vary. The fibrous tissue is mostly perivascular and differs from the deep-seated lymphatic glands in that, owing to its peripheral position, it has an epithelial covering. The epithelium covering the mass may be squamous or columnar; the latter is sometimes, though rarely, ciliated. A basement membrane can usually be detected. The epithelium—and sometimes the deeper tissue—is necrotic. The crypts are often deeper than normal and are not infrequently filled with caseous material. Dieulafoy found tubercle bacilli in 20 per cent. of the adenoids ex-



Fig. 30. A large adenoid, showing lobes and structure from its anterior surface. Actual size.

amined. Of 75 examined by Lartigan and Nical, eight contained tubercles and bacilli, and four, tubercles without bacilli.

The epithelial covering is not always of the same thickness, and often there is a change in the type, varying from the ciliated columnar to the stratified squamous of considerable thickness. There is also considerable variation in the proportion of lymphoid and fibrous tissue. McBride and Turner have endeavored by a comparison of the appearances in patients of different ages to seek some explanation of the gradual shrinking or disappearance which takes place in adenoids in the course of time. An over-growth of fibrous tissue occurs around the bloodvessels, presumably by a process of perivascular sclerosis; at

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any rate, it is in the neighborhood of these bloodvessels that the greatest amount of fibrous thickening is found. If an area be examined in which this change is taking place, some of the bloodvessels present a normal appearance; others show distinct thickening of their walls in concentric rings, with diminution of their lumen. Some of the vessels have been found to be completely obliterated, owing partly to the great thickening of their walls and partly to the contraction of fibrous tissue outside. There can be no doubt that the gradual shrinking of the adenoid mass is produced by the formation of fibrous tissue around the bloodvessels.

In view of these facts, it appears that a development of fibrous tissue takes place in the substance of the adenoid hypertrophy, commencing around the bloodvessel, invading and replacing



Fig. 31. A photograph of forty tonsils and twenty adenoids removed from patients at Gouverneur Hospital by the author in two mornings.

the lymphoid tissue. This, however, is independent of the age of the patient and does not necessarily commence at or after puberty, but may occur at all ages and be even more marked in the very young child than in the adult. It follows, therefore, that in any given case the growth cannot be left to disappear of itself. It may vanish or it may remain. At the present time there are no means of positively determining how soon it will disappear or whether it ever will. Therefore. why delay operation and subject patients to the oftentimes dangerous consequences of adenoids?

Symptoms. The most constant symptom of adenoids is mouth breathing. The facial expression is dull and listless, and the upper lip is thickened and protrudes. The patient usually snores at night. The hard palate is arched, and there is mal-occlusion of the teeth, the upper set projecting over the lower. There is often a fetid breath, due to particles of decayed food remaining in the crypts, and there is generally



Fig. 32. This face shows the adenoid expression. (From the clinic at Gouverneur Hospital.)

more or less pharyngeal irritation and catarrh, as it is commonly called. The patient takes cold easily.

On looking into the throat, the ragged edges of the adenoid tissues are sometimes seen projecting down into the pharynx. Upon examination of the epipharynx with the index finger behind the soft palate, a soft, pliable, gelatinous, wormlike substance is felt. Adenoids bleed easily, and often a piece of adenoid tissue remains on the finger as it is withdrawn. With a laryngeal mirror and proper illumination the outline of the mass can be seen. The diagnosis can usually be made by examination of the naso-pharynx with a small throat mirror. This method is preferable to examination with the finger.

In most cases the mother complains that the child is very restless at night and has night terrors, associated with nocturnal enuresis. The hearing is often impaired, and not infrequently there is an otitis media, either chronic or acute, suppurative or non-suppurative. The child is also restless and nervous in the daytime and is not content long at any one occupation or entertainment, and the mentality is lowered. When

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mothers bring their children with symptoms of worms, as they say, the child is more frequently suffering from the effects of adenoids.

Taste and smell are modified by adenoids, as these special senses are so intimately associated



Fig. 33. This picture illustrates to a marked degree the adenoid expression. (From the clinic at Gouverneur Hospital.)

with the epipharynx. The voice is also much affected; just as the dimensions of the vestibule are changed by adenoids so will the resonance of the voice be changed, and it frequently has a muffled, thickened sound. Large masses of adenoids, however, have been found in children whose facial expression was not altered and who had none of the characteristic symptoms

The diagnosis of adenoids is made from the typical facial expression, the characteristic sound of the voice, the history of mouth breathing, the fetid odor of the breath, the lowered mentality or the nervousness; and it is confirmed by feeling the adenoid mass in the epipharynx with the index finger, or, better still, by observing its outline and general appearance with the throat mirror and proper illumination.

Effects. The immediate effect of adenoids is to produce nasal obstruction and mouth breathing. Mouth breathing produces deformities of the mouth, teeth, face, palatal arches, chest and bones. It also predisposes to many systemic conditions, such as tuberculosis, pneumonia, and diseases of the gastro-enteric tract. It is well known that the nasal mucous membrane is so constructed, histologically, that the air inspired through the nose is filtered; but when inspired through the mouth it is not filtered, and in this way many pathogenic germs gain easy entrance to the general system.

Mouth-breathing from adenoids produces the narrow V-shaped palatal arch with high palate and protruding upper teeth. Malformations of the lower teeth are also found. They lose their normal relation to the upper teeth in the antero-posterior aspect. The lower front teeth, instead of occluding just back of the edge of the upper incisors, are posterior to this position by a distance of from one-eighth to three-quarters of an inch, and in super-eruption to the extent that they are sometimes found imbedded in the tissues of the soft palate. The following case illustrates this condition very well:

M. J., aged twenty years, consulted the writer because of nasal obstruction She had never been able to breathe properly, and her whole facial expression gave evidence of the fact. Her mouth was always open; her upper lip was thickened and protruded; her palatal arch was narrowed and V-shaped to a marked degree. The front upper teeth protruded, and when she closed her mouth the lower central incisors were three-quarters of an inch posterior to the corresponding teeth of the upper jaw. Her nose also showed the effect of adenoids which had been left to shrink up. The anterior nares were narrowed and had a pinched, drawn appearance. The septum was deflected, and its posterior part was attached to the middle turbinate bone on the left side. A very large mass of adenoid tissue was removed, and subsequently a sub-mucous resection of the nasal septum was performed and the turbinal adhesions on the left side were broken up. The young lady was greatly benefited by these operations, but the condition was not attended to soon enough and the adenoid expression will mark her for life. No dentist will ever be able to correct the contour of the narrow, high arched, V-shaped palate or the mal-occlusion of the teeth, as the bony structures are completely ossified at this age.

Adenoids produce marked deformities of the chest, pigeon breast or chicken breast being one result of continual mouth breathing. The general development is also interfered with. The

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writer has removed tonsils and adenoids from delicate, anemic or poorly nourished children, who invariably gained in weight. In many instances the improvement in the general condition was remarkable. Recently, after such an operation, a boy of ten years gained two to three pounds a week until his normal weight was reached.



Fig. 84. According to some authors there is a close relation between adenoids and rickets. This photograph from the Hospital for Ruptured and Crippled shows a child with bow-legs and adenoids.

Rickets is often caused by the presence of adenoids, as this disease is a condition of chronic carbonic acid gas poisoning. Adenoids affect the general nutrition, since the normal respiratory passages are obstructed and an excess of carbon dioxide remains in the blood Frederick Coolidge has pointed out the relation between adenoids and clubfeet, and Ballenger has confirmed this in his saying: "Show me a bow-legged man and I will show you one who had adenoids in infancy." In the writer's service at the Hospital for Ruptured and Crippled, most cases requiring osteotomies also need the tonsil and adenoid operation.

Adenoids produce anemia. In most cases there is a diminution in the number of red blood corpuscles and a lowered percentage of hemoglobin.

It is well known that children with adenoids do not make as rapid progress in school as they otherwise would. It is difficult to understand just why this is, but the fact remains that their mentality is below par. It may partly be due to the defective hearing so often present in these cases.

Children with enlarged adenoids and tonsils frequently have cervical adenitis and more or less frequent elevation of temperature.



Fig. 85. Chicken-breast, a deformity of chest frequently associated with adenoids. This little patient at the Hospital for Ruptured and Crippled also has Pott's disease.

The effect of adenoids and enlarged or diseased tonsils upon the auditory apparatus is one of the most important consequences. Ear complications are present in the majority of cases. Often the adenoid mass encroaches upon the Eustachian tube. Even though it does not touch the orifice, the epipharynx is obstructed, thus interfering with the proper rarefaction of air going to the Eustachian tube. Furthermore, there is an extension of the inflammation to and into the Eustachian tube. Consequently, we see cases of otitis media, chronic and acute, suppurative and non-suppurative, and frequent attacks of earache in children—all as a sequel of adenoids.

Recently the writer saw a young man, twenty-five years of age, whose adenoids had been removed two years previously, and who first consulted a rhinologist because of partial deafness in one ear. The surgeon had very properly removed his adenoids, but the damage had already been done and this young man will have chronic otitis for the remainder of his life.

It was one of those cases where the membrana tympani has assumed a dull ground-glass appear-

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ance, and the best consolation that could be offered was: "By more or less constant attention at frequent intervals, it may not get any worse, but it cannot be promised that the hearing will ever be improved." This is a sad prognosis



Fig. 36. Knock-knees, a rachitic deformity frequently associated with adenoids. (From the Hospital for Ruptured and Crippled.)

for any young adult, and the case illustrates how serious are the ear complications of adenoids. Furthermore, after the inflammation has extended into the Eustachian tube and middle ear, it is but another step for it to involve the mastoid and then it is a problem jeopardizing life itself.

Prognosis. The prognosis depends upon the duration of the condition and the extent of the secondary changes. When operation is performed early, before serious pathological conditions are produced, the outlook is exceedingly good. On the other hand, after the facial expression has become markedly changed and the bones of the face are completely ossified, or serious deformity of the chest (such as pigeon chest) has been acquired, or where the drum membranes are much thickened and retracted, the parents of the child should be told that the operation is undertaken to prevent further harm rather than for the correction of the damage that has already been done. Many cases of chronic suppuration of the middle ear associated with adenoids may be cured by the removal of these and of the tonsils and subsequent local treatment of the ears. The mentality of many mouth breathers may be wonderfully improved by the operation, but it cannot transform imbeciles or distinct mental defectives into bright children, and any such prognosis must be deprecated. The degree of improvement in the general health and vigor of the patient will depend upon the extent to which the adenoids were responsible for the condition. Systemic affections, such as rheumatism, endocarditis, nephritis, etc., are so frequently the sequel of septic tonsils and adenoids that after their removal with the focus of infection these conditions are often cured. Various neuroses that are occasionally due to adenoids—asthma, enuresis, epilepsy—may be benefited by the operation. Certainly, in asthma the removal of any obstruction or irritation in the respiratory tract should be advised. Such treatment is often followed by more or less complete relief. The etiology of the condition, however, is so obscure and operative measures are so frequently disappointing as to justify only such a prognosis as might be expected to follow the natural systemic improvement. The writer has seen six asthma cases completely relieved by removing obstructions found in the noses and throats of the patients. In one of these cases (a little girl seven years of age), the removal of the adenoids cured the asthma, which, so far as known, has not recurred. In another case, the removal of the adenoids and posterior tips of the inferior turbinates and a submucous resection accomplished a cure. In others, the removal of ethmoid cells and polypi and the clearing up of the tonsillar infections have accomplished the desired results.

Treatment. If adenoids require any treatment, they should be removed by surgical operation.

Operation. This can be done under either local or general anesthesia. For children, the latter is preferable. Ethyl chloride followed by ether has been quite satisfactory in the writer's experience. Ethyl chloride by inhalation for a short period is one of the safest anesthetics for children. A satisfactory local anesthesia may be produced in adults by painting the naso-pharynx with 20 per cent. cocain solution. A curved applicator, wound with cotton saturated with the solution, is passed through each nostril over the surface of the adenoid, which is then further cocainized by applying the solution around it behind the soft palate.

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The arch and base of the tongue are also cocainized to prevent irritation and gagging.

The most satisfactory instruments are Beekman's curette, Alexander's adenoid forceps, and La Force's adenotome, the last being especially

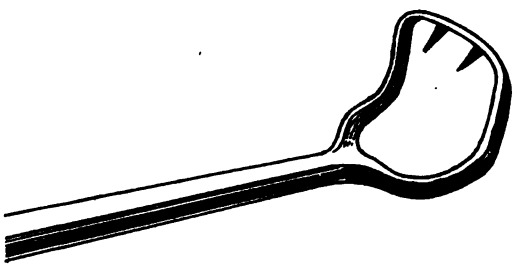


Fig. 87. The author's adenoid curette. The little knives, placed at right angles to the curette, engage the body of the adenoid, cutting simultaneously with the curette. When the base of the adenoid is cut through, all resistance to the small knives is stopped, and they act as a hook and deliver the adenoid mass intact.

satisfactory for large adenoids in adults under local anesthesia. For children, where the adenoid contains little fibrous tissue, the Beekman curette is preferable. Adults are operated upon under local anesthesia in the sitting posture, but for children under general anesthesia the recumbent posture is preferable. The after treatment for children consists in keeping them quiet in bed for a day or two and giving them a soft diet. Cold milk and ice cream are excellent articles of food for the first day. There is occasionally troublesome hemorrhage, but this is rarely serious. It is controlled by keeping the patient quiet and applying ice cold compresses to the head and neck. Silver nitrate solution, 5 to 20 per cent. applied locally, acts favorably in such cases. It is hemostatic, astringent, antiseptic, and favors rapid healing.

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(*To be Continued.*)

It is interesting that although ulcer occurs more frequently in the duodenum, cancerous degeneration there is rare. It is said the pancreatic secretion is inimical to cancer. At any rate it is extremely rare in the small intestine. Mayo only had fourteen cases in fifteen years, of which but five were operated on. I have reported a case of resection of forty-two inches of the small intestine for sarcoma in a boy of nine, who is alive and well at the end of three years. —Dr. W. D. Haggard (*South. Pract.*, July, 1915).

THE DIAGNOSIS OF RUPTURED GASTRIC ULCER AND CARCINOMA OF THE BODY OF THE UTERUS: ILLUSTRATIVE CASES.*

By Richard N. Duffy, A.B., M.D.,
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In the routine of practice one frequently encounters cases which are out of the ordinary—cases which put one "on his mettle," so to speak. It is just these cases which teach us valuable facts, that make us better diagnosticians and increase our therapeutic skill. There is no satisfaction I know of greater than that which comes from a difficult case brought to a successful and a happy termination; and on the other hand, there are no lessons that are better learned by us than those which come from our failures.

I have picked out two surgical cases from my records which have been very instructive to me, and, with your permission, I will present them to you as briefly as possible.

The first case is that of Jos. E., a Syrian drygoods merchant, aged 38. The patient first applied to me for treatment about five years ago. He gave a marked alcoholic history, and from the symptoms and signs present at that time I made a diagnosis of gastric ulcer. Under a strict diet, absolute rest, and a combination of alkaline remedies his symptoms after a few weeks were entirely relieved and he gained about 30 pounds in weight. His improvement lasted for a number of months until he finally returned to the alcoholic excess and his old symptoms returned. During the past four years he has taken great quantities of bicarbonate of soda to relieve excessive gastric acidity. His dietetic habits have largely followed his inclinations except when he was in great distress from pain. Strange to say, this pain, which was always about the mid-point of the epigastrium, was practically never present when his bowels were active.

The patient struggled along in this manner, refusing further treatment, until March 27, 1914. At this time he complained that for several weeks past he had suffered from much flatulence and "sour stomach." Nearly everything he ate became very sour, and in about an hour he vomited it. There was very little pain. When his bowels

* Read before the Second District Medical Society, at New Bern, N. C., May, 1914.

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moved well he had no trouble. He had become quite weak and nervous.

I made the following note at that time: "Patient shows evidence of loss of flesh. Expression good, eyes clear. Tongue heavily coated. Heart and lungs negative. Abdomen rather full and abnormally tympanitic. Percussion outline of stomach normal. No tenderness over gallbladder, duodenum or appendix. Slight tenderness in upper epigastrium. No enlargement of liver or spleen. Neither kidney palpable."

I did not see the patient again for a week. On the afternoon of April 3rd, I was again called to him. He stated that he had been up and about the house that morning; that his condition had apparently been improving; that he had eaten a rather "hearty" dinner, and shortly thereafter was seized with pain in the epigastrium. He did not describe this pain as of a sudden, severe, stabbing character, but said that it felt like his stomach was being pulled hard up towards his chest. He stated that he had been constipated for a day or two and that he had had practically similar experiences, though not quite so severe, when constipated on former occasions. Acting on this idea he had taken magnesium sulphate before I saw him. He had not, however, had any bowel movement. He had vomited several times after the onset of the pain. The vomitus was quite acid. It contained no blood. As a matter of fact there had *never* been any macroscopic evidences of blood in the vomitus or the stools.

The patient was propped up in bed when seen. Although he complained of much discomfort, he said the pain was not so severe. His facial expression was fairly good. His pulse was rather rapid but of good quality. The abdomen was slightly distended, markedly tympanitic, especially in the upper half, and there was practically obliteration of the liver dulness. Tenderness was quite marked at the mid-point of the epigastrium. There was slight tenderness elsewhere, but not marked. There was practically no rigidity except in the epigastrium, and here it did not attain to the degree of muscle spasm. I could make out no dulness in the flanks.

On account of the patient's somewhat similar experiences in the past when he was constipated, although ruptured gastric ulcer was thought of, I did not think the symptoms and signs quite marked enough to warrant this diagnosis. I gave him a hypodermic of morphia and ordered a soap suds enema to be given. In about three hours I was called to him again. He was then suffering more severely. The enema had been given but had not returned. The patient's expression at this time was not so good. His face was rather drawn. His pulse was more rapid and more compressible. He complained of excessive thirst. The temperature was normal. The abdomen at this time was more distended. The tenderness was more general and there was rather marked general rigidity. There was no muscle spasm. I could still detect no dulness in the flanks. The diagnosis of ruptured gastric ulcer was practically determined upon, but unfortunately was deferred for the following reason: I gave the patient an enema consisting of an ounce of epsom salts and two ounces of glycerin in a pint of hot water. This was very promptly effective and resulted in the evacuation of a large amount of fluid fecal matter and quantities of gas. The patient said he felt much better after this and the abdominal distension and rigidity were much less marked. This was about 11 p. m. I left orders to repeat the glycerin and epsom salts enema, if necessary, and also left two tablets of ¼ gr. morphin sulphate and 1/150 gr. atropin sulphate, with instructions to take one, if necessary, and repeat in one hour, if not relieved.

I was called again at 6.30 a. m. The patient had suffered pain constantly. He had taken both of the morphin and atropin tablets, but the pain was nevertheless worse. It was now quite general. He had the typical Hippocratic facies. His pulse was very rapid and almost imperceptible. The temperature was 96.5°. He had vomited quite constantly during the night, never any blood. He had taken large quantities of water and was unable to quench his thirst. The respirations were shallow and rapid. The abdomen was markedly distended, quite tender and rigid. Muscle spasm was present. There was dulness in the flanks. A leucocyte count showed only 5,600 leucocytes per ccm.

Notwithstanding the fact that there was and had been no elevation of temperature and no leucocytosis, it was now quite evident that the patient

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must be suffering from a severe grade of peritoneal inflammation. Although there had been no appearance of blood at any time, the past history coupled with the onset and development of the symptoms made the diagnosis of ruptured gastric ulcer practically certain.

Accordingly, although the patient's condition was practically hopeless, operative intervention was offered as furnishing the only possible hope. Hurried preparations for operation were made. A left rectus incision was made under a very light ether anesthesia. Immediately upon opening the peritoneum a large quantity of turbid, straw-colored fluid welled out. It contained many flakes of fibrin but no blood. I have never seen before so large a quantity of fluid in the abdominal cavity in a peritoneal inflammation, this being due no doubt to the excessive amount of water which the patient had taken into his stomach. On exploring the abdominal cavity a quantity of plastic exudate was found about the pyloric end of the stomach, and here on the anterior surface was found a perforation about 2 cm. in diameter. The edges of this ulcer were as indurated as one finds in carcinoma. The perforation was closed as rapidly as possible and a cigarette drain inserted. No drainage was established in the pelvis, as the patient's condition did not warrant further operative procedure. The entire operation occupied only about twenty minutes and the anesthesia was very light, but the preoperative shock was greatly increased by the operation and saline hypodermoclysis, adrenalin subcutaneously, salt and coffee per rectum, and other measures to combat it, had no effect, the patient dying shortly after the completion of the operation.

There are many important lessons to be learned from this case. To me the most important lesson is this: It is better to operate on suspicion that a case may be ruptured gastric ulcer than it is to await the full development of symptoms. Exploratory laparotomy in cases where no lesion is found, "laparotomie blanche" of the French, is attended with practically no mortality. Ruptured gastric or duodenal ulcer is not as infrequent as most of us suppose and is uniformly fatal unless operation is instituted early. Considering, therefore, the difficulties in diagnosis we are certainly acting in the interest of the patient to do an exploratory laparotomy whenever there is a strong suspicion of these perforating lesions.

In the diagnosis of perforated gastric ulcer the first consideration is the character and the location of the pain. As in all the abdominal perforative lesions, the pain is usually sudden, sharp, severe, lancinating. It makes the patient cry out. He flexes his thighs on his abdomen and draws his body to his thighs, making pressure upon the abdomen. In my Syrian patient I could not elicit this history. The location of the initial pain is always in the epigastrium, and this point in the history is of course most important. Later on when the fluids have gravitated to the lower abdomen and tenderness has become general it is obviously impossible in most instances to diagnose the seat of the lesion without the history of the location of the pain of onset.

After perforation of a gastric ulcer there ensues almost immediately, as a rule, a severe grade of shock. This is supposed to be due to the change in blood-pressure produced by the transference of air within the stomach to the free peritoneal cavity. As soon as the shock becomes fully developed the pain seems to be not so severe or becomes less unendurable in most instances. In my case this probably accounted for the fact that the patient when I first saw him complained of marked discomfort in the epigastrium rather than of severe pain.

Vomiting occurs in a large series of cases, and is most serious as it forces the stomach contents out through the perforation as well as by way of the esophagus. Vomiting was a marked feature in my patient.

Tenderness and rigidity of the abdomen arise about the same time and indicate the beginning of the peritoneal reaction. As already recited in my case, these signs were not present to a very appreciable extent when I first saw him.

Unquenchable thirst is a very frequent and characteristic symptom. The patient constantly calls for water and in vain tries to relieve his thirst. This condition was present to a marked degree in my patient.

Obliteration of the liver dulness is usual in these cases and was present in mine. This, however, is an unreliable sign, as extreme tympany

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without perforation may produce a similar condition.

Soon after the onset of the perforation, coincident with the beginning shock, there is a fall in the temperature. Later on there may be a rise, but in the presence of an overwhelming amount of toxic absorption the temperature may remain subnormal. This was evident in my case. The pulse rate rises with the onset of shock. The vessel wall becomes more and more compressible as the condition advances. There is usually present leucocytosis unless the infection is so overwhelming as to prevent a protective reaction.

It is quite evident that a good history is most important in the diagnosis of acute gastric perforation. The conditions most apt to be confounded are perforation of the appendix, the duodenum and the ileum, the frequency being in the order named. The symptoms of duodenal perforation are practically the same, of course, as those of gastric perforation, and as the indications for treatment are practically similar the two conditions may be considered as one.

The appendix rarely perforates without some premonitory attack, and even when it does perforate the symptoms are rarely of so alarming and prostrating a nature as when some portion of the digestive tract of a larger caliber is perforated.

Perforations of the ileum are rare except during typhoid fever. The location of the pain of onset is in the right lower abdomen, as a rule.

Perforation of the appendix and ileum may produce initial epigastric pain, but it is rare for gastric or duodenal perforations to cause other than pain in this region. In gastric and duodenal perforations the general peritoneal cavity becomes more quickly involved than in perforations in the lower abdomen. In the latter class the pelvis usually is first involved and the umbilical and epigastric regions only later; whereas in the former these regions are immediately affected and the fluids gravitate to the pelvis later. In a great many gastric perforations in which there is not an excessive amount of fluid introduced into the peritoneal cavity the transverse colon and the great omentum protect the hypogastric region and the pelvis from early invasion. The splenic flexure of the colon being as a rule higher than the hepatic flexure, the fluid has a tendency to flow toward the right, and, following the ascending colon down, collects first in the right kidney pouch and then in the right iliac fossa. The resemblance in these cases, of course, may be very close to appendicular abscess, and without an accurate history the diagnosis may be impossible before operation.

In my case there was such an enormous amount of fluid introduced that all portions of the peritoneal cavity were very early involved.

The treatment of acute gastric and duodenal perforations is imperative, as 99 per cent. of all cases die without operation. The sooner it is instituted the better the prognosis, though Gross and Gross in their statistics claim that the mortality is higher if it is performed in the first five hours after the onset than in the next five hour period. The majority of the patients can be saved by operation in the first twenty-four hours and the prognosis becomes rapidly more grave after this time. A simple closure of the perforation with a purse-string suture covered over by a row of mattress sutures, the institution of drainage to the affected region, and also drainage in the pelvis if the peritoneal involvement is extensive, are sufficient in most cases, though Deaver and others recommend a posterior gastroenterostomy when the condition of the patient will allow it.

One more case which I wish to report illustrates the extreme importance of carefully examining all women complaining of abnormal pelvic symptoms.

Mrs. T., white woman, aged 46, first consulted me about three months ago for slight pain in the lower abdomen and back and irregular menstruation. She had missed her periods for three months, then had a normal period. She had missed again three months, and now felt as if menstruation was coming on again. Up to six months before I saw her her periods were regular. She had been married about twenty years but had never been pregnant. Her general health was good. There had been no loss in weight. There was no foul vaginal discharge, but a slight leucorrhea. There was no family history of cancer or tuberculosis.

On pelvic examination the uterus was found to be small and only slightly tender. It was in

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anteposition, freely movable. There were no masses laterally. The cervix was not enlarged and was normal in consistency. There was no laceration. The cervix was normal in color.

About two weeks after I first saw the patient she had an apparently normal menstruation. Following this, however, she continued to have slight irregular bleeding nearly every day. The pelvic pain and backache became more severe. I advised her to have a curettage for diagnostic purposes and she consented.

At the operation, when the curette was introduced into the uterus, a mass could be felt at about the junction of the upper portion of the cervix with the uterine body. This mass was more noticeable on the right side. It felt about the size of a pigeon's egg. The scrapings obtained from the uterine cavity were rather granular in appearance, and microscopical examination of sections of these scrapings revealed a definite squamous celled carcinoma. Immediate hysterectomy was advised. The patient, however, waited for several weeks, during which time she had a severe uterine hemorrhage and the pain became rapidly worse through the lower abdomen and back. (An interesting point is that this pain was completely controlled by aspirin.)

I again operated on this patient about four weeks ago, doing a pan-hysterectomy with a wide dissection of the pelvic fascia. I was very much surprised to find that the cancer extended all the way through the uterine wall and was adherent to the bladder. The bladder was therefore opened into in removing the uterus. There had been absolutely no bladder symptoms.

The patient has done well since the operation and is now at her home, and in excellent condition. I am afraid, however, that she will have a recurrence in view of the extension of the growth through the uterine wall.

This case illustrates the extreme importance of microscopical examination of uterine scrapings in all doubtful uterine cases. There was absolutely no evidence from the usual bimanual and speculum examination in this case upon which one could have made a diagnosis of carcinoma.

PROPHYLAXIS OF PUERPERAL FEVER.*

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I believe no apologies are necessary for the subject of my paper. Puerperal septicemia must be of intense interest to the general practitioner as well as to the gynecologist and surgeon. To the general practitioner rather as the terrifying ghost of Banquo and to the surgeon and gynecologist as an El Dorado, a golden field for his special endeavors. Let me assure you, right at the beginning, that my intention is not to write a severely formal "scientific thesis." Indeed, you might consider my effort as a hodge-podge of heterogeneous trivialities, more in the nature of a scrambled egg as it were; but if you will find a little bit here and there lingering in your memory and worthy of serious thought, I am sure you will condone the foibles and frailties of the writer.

A very brief survey of the earlier theories and views concering the nature of puerperal septicemia may prove of some interest.

Hippocrates and Galen taught that puerperal fever was the result of the suppression of the lochia. They confounded a symptom, which was often lacking, with the cause of the disease itself. For twenty centuries this doctrine was accepted almost without dispute.

In 1686 Puzos, a French authority, taught that milk accumulating in the blood is attracted to the uterus during pregnancy and to the breasts after confinement; and also that milk metastasis may form in other parts and produce the symptoms of malignant or intermittent fever. In support of this theory of milk metastasis it was pointed out by Fontaine and others that on opening the abdomen in women who died from puerperal fever a lactescent fluid was found in the lower part of the abdomen, and clotted milk, as they assumed it to be, was adherent to the intestines.

In 1801 Bichat gave the theory of milk metastasis its death blow by demonstrating that this same lactescent fluid is found in peritoneal inflammations occurring in men and in non-puerperal women.

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During the second half of the 18th century, England and Germany, the dominant leaders in medicine, referred the cause of puerperal fever to inflammations of the womb and peritoneum. With the advances made in pathological anatomy in the beginning of the 19th century, France taking the lead, stress was likewise laid upon inflammation of the veins and lymphatics.

In opposition to the doctrine of the so-called localists, the theory that puerperal fever is an essential fever and as much a distinct disease as typhoid fever or relapsing fever has been strenuously advanced and hotly advocated by some of the most distinguished clinical teachers of the obstetric art. In 1850 James Y. Simpson published a short paper in the *Edinburgh Medical Journal* on "The Analogy between Puerperal and Surgical Fever." This article may well be regarded as the corner-stone of the modern conception of the infectious nature of puerperal fever. For though many links were wanting because of the then incomplete knowledge of pathology, the paper furnishes a brilliant example of scientific foresight, and at present all the links have been forged and his argument has been verified to nearly a mathematical demonstration.

In 1847, Semmelweiss, who was at that time clinical assistant to the Lying-in Hospital at Vienna, made the startling assertion "that puerperal patients were chiefly attacked with puerperal fever when they had been examined by physicians who came fresh from contact with poisons engendered by cadaveric decay; in other words, that fever ensued in the practice of those who after post-mortems washed their hands in the usual manner, whereas no fever followed when the examiner had previously washed his hands in a solution of chloride of lime." In the face of insult, ridicule and abuse of all kinds, Semmelweiss maintained this position for years with the dogged persistence of earnest conviction. He died a martyr to science, impoverished in means and reputation, an inmate of an insane asylum. It may be of interest to note that Buda Pesth, his native city, has at last aroused itself to the realization of Semmelweiss's merits and has tardily rendered him the honors which his labors for humanity deserve. A handsome monument has been erected to his memory, a street has been named after him, and the house he was born in has been reclaimed and commemorative tablets affixed to it. The pathetic quotation concerning Homer may in a sense be applied to Semmelweiss—"Seven cities claimed Homer dead, through which living Homer begged his bread."

Another name which must be recalled in connection with the nature of puerperal fever is that of Oliver Wendell Holmes. Four years before Semmelweiss made his famous announcement, Dr. Holmes announced that puerperal fever was due to infection, and ably defended his position. The profession at large, however, did not accept his tenets; in fact he was subjected to ridicule and all kinds of aspersions were cast upon him. Fortunately, even at that time his reputation and emoluments as a writer made him independent of the practice of medicine, otherwise he would no doubt have experienced the same fate as Semmelweiss. It speaks rather poorly for the medical profession in our country that no appropriate measures have as yet been taken to commemorate Dr. Holmes's connection with this advancement of medicine. Because we are prone to accentuate his literary and poetic accomplishments, because in our memory his name is intimately entwined with the "Autocrat" and "The Professor of the Breakfast Table" — these are but meagre excuses for our apparent neglect.

Be that as it may, let us proceed to the subject proper of this paper. The modern trend of obstetrics, in line with all branches of medicine, is the burnishing, reinforcing and perfecting of our weapons of prophylaxis. In the practice of medicine, the ultimate, absolute perfection of prophylaxis would result in the total eradication of disease, while in obstetrics it would mean the inevitable routine delivery of healthy infants, followed by uncomplicated puerperia; septicemia, the bugbear of obstetrics, would no longer menace our parturients. With this goal in view, let us lightly touch upon certain of the broader aspects of the obstetric art.

Just as the red and white striped barber pole forcibly reminds us of the once universal practice of blood-letting and the multiform functions of the tonsorial artists of those days, so do midwives as a class remind us of our great-grandmothers' times, when the neighborly housewife

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was wont to render first aid to the parturient, return to her interrupted bread making and leave the sick woman to the tender mercies of nature. Midwives may indeed be blessings in disguise; but the disguise is so complete that the blessings can seldom be recognized. Jacobi, in an article of recent issue, has sapiently pointed out the necessity for midwives among the poorer classes, at the same time taking a fling or two at the medical practitioners themselves. Indeed, we must agree with him that efficiently instructed midwives, alive to the dangers of even a so-called normal labor, expert in the recognition of abnormalities, and imbued with a wholesome regard for Listerism, would be a great boon to the child-bearing community. But these ideal qualifications are rarely found together, although the Maternity Hospital of this city and the few kindred institutions established in some of our other cities give us hope that the Utopian dream of Professor Jacobi may prove a reality in the dim and distant future.

Yet if we save our expressions of disapproval of the habits and practices of the midwives, shall we hold back our invectives against the euphonically styled "wartsfrauen," or nurses whose sole essential qualification seems to be the affliction with an improvident husband! True, among these women we will very occasionally find one or two who take up their work as a serious vocation and not as a side-line to their other activities, or as an interruption to the humdrum of domestic monotony, and these chosen few merit our approbation and hearty co-operation. But the custom particularly rife among the foreign-born to take in during their puerperium the next-door neighbor, or some superannuated relative, who has time at her disposal but knows as much of asepsis as a gibbering orang-outang knows of transcendentalism, this practice surely merits our unmitigated censure; these ignorant "wartsfrauen" are responsible for a lamentable number of septic cases.

And while we are distributing our bouquets let us not slight some of the shining lights in our own profession; these merit a bouquet, quite distinctive. I have special reference to that dwindling minority who still believe in the soap and water theory of asepsis, who regard the boiling of instruments as a woeful waste of valuable time, and the use of bichloride of mercury as an especial affront to the delicate sensibilities of their tapering digits. They forget that "Cleanliness is Godliness" only to the unaided eye and not to the eye fortified with the lens of the microscope. Little wonder, these disciples of the aqueous saponic theory of Listerism are peculiarly favored with ample opportunity of testing out on their cases the various treatments of puerperal infection.

But what shall we say of the fledgling M. D. who, after delivering a full half-dozen normal cases, qualifies under the law as an obstetrician, prepared and willing, particularly willing, to cope with the multitudinous exigencies of an obstetric practice. Fortunately the great majority of them have the knowledge that they don't know, and when confronted with difficulties have the discretion to call in a more experienced confrere, or to wisely shift the burdens of an onerous case by sending it to one of the numerous institutions. But some of them are so puffed up by their imagined innate capabilities that they recognize no limitations; these are bound to leave a trail of devastation after them. I have myself met with one of these knowing ones, just out of the medical incubator, who had the temerity to ram his hand through a centrally implanted placenta, perform a version and drag an unwilling fetus through a meagerly dilated os. The infant, fortunately or unfortunately, survived the drastic manipulations, but the mother promptly paid the penalty of the juvenile rashness.

I believe the contention of advanced medical educators that the graduate of medicine be compelled to serve an apprenticeship in one of the recognized hospitals, is a just one and will no doubt ultimately prevail. It is my opinion that a six-months' interneship in the maternity ward of a well-filled hospital, under the guidance of a conscientious man, will give the aspiring youth a concentrated experience equivalent to a ten years' private practice of the average general practitioner, who perforce acquires his knowledge in tit-bits.

But while we are patting ourselves on the shoulder, and none of the laity is eavesdropping, let me ask how many of us veteran practitioners take special precautions when called to attend a labor case because we had previously attended a case of scarlatina, a pus case or some other form of infection. And yet infectious agents may be lurking under our

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finger nails in spite of the most vigorous scrubbing, or in our clothing, or in the hairs of our head, if we have such superfluous appendages. The least we might do is to change our clothing, shampoo our head, use a sterile gown and sterile gloves. Furthermore, if I am not too inquisitorial, I wonder if anyone among us has ever attended a labor case and delivered the parturient, having nothing at all with him save his little knowledge of obstetrics, a shoestring in either shoe, and an ardent hope that the pathogenic germs in the neighborhood were off duty?

A question which has some bearing on the prevention of puerperal fever, and which has lately received considerable attention, is "Which is more conducive to the welfare of our parturient patient, her delivery and care in a hospital or in her own home?"

There is no doubt that a lying-in room may be fitted up in the ordinary house, with the aid of a capable nurse, in just as sanitary manner as one in the hospital. There is furthermore no doubt but that the accoucheur is able to render the same skilled service in the home as in the hospital. But the pertinent question is this: "Do physicians have the lying-in rooms of their parturients arranged with a scrupulous regard for asepsis, and are they inspired to do the best kind of work at the homes of their patients, with the circle of critical friends and neighbors close at hand?" As to the preparation of the room, I believe we are apt to be negligent; any old room, with any old draperies and rugs, suffices. The bed is not always prepared punctiliously, the vulva of the patient is very seldom shaved (indeed, many women strenuously object to this procedure when they are in their own homes), nor are we as a rule supplied with sterile gowns and sterile gloves, or sufficient skilled assistance. True, all these may be supplied at the home, but the point is, they rarely are. Again, the hospital breathes a scientific atmosphere, as it were. In the home we are, 'tis sad to admit, too apt to think of dollars and cents and dramatic impressions. But the hospital is the physician's workshop; here he is a votary to science, inspired by lofty ideals and urged to exert his capabilities to the utmost. It is this intangible entity which makes us treat the ward patient with the same concern as the private patient. Our aim is to obtain good results.

However, when the casual observer scans the statistics of puerperal fever, he is apt to hastily conclude that infection is more likely to follow delivery in the hospital than at the home. This impression is entirely erroneous. Because a seemingly larger proportion of septic cases develop in the institutions than in the homes this does not prove anything. If these very same cases had been delivered at their respective homes, no doubt a larger number would have been infected. In this connection it is well to bear in mind that a large number of pathological cases are sent into the hospitals after futile attempts at delivery have been made, with perhaps meager aseptic precautions. Besides, a goodly proportion of hospital cases are "midwife" cases, some of them sent in *in extremis*, after a prolonged and prayerful wait for days, in the hope, perhaps, that nature might miraculously deliver an impacted shoulder presentation. These facts must be borne in mind before we jump at hasty conclusions. Personally, I prefer, if I have my choice, to deliver my cases in the hospital; I can do better work than when I am unhampered by domestic influences.

Coming down to the more specific measures for the prevention of puerperal fever, it is well to bear in mind that they must include not only those which are conducive to the resistance of the patient and those which tend to prevent unnecessary lacerations, but also those which hasten the normal retrograde processes of involution.

The ante-partum preventatives have a distinct but somewhat remote relation to septicemia; so we might gloss over the subject, remembering only that they comprehend all agencies, hygienic, dietetic and calisthenic, which tend to put the expectant parturient in the pink of condition. With the circulatory and nervous systems in good working order, the emunctories functionating, and the musculature in robust tone, the patient can surely resist ordinary infection more effectually than the one whose health is below par.

But it is the partum and post-partum preventatives with which we are more directly concerned. When we bear in mind that even in the most normal deliveries, if I may use so incongruous a term, we have a number of denuded or excoriated areas readily inoculable—the large uterine wound at the placental site with its monster sinuses, wide open

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like hungry mouths, the torn cervical fibers, the denuded spots of vaginal mucosa and the over-stretched if not lacerated perineal body, with its impoverished circulation—when we remember these areas of possible infection in normal deliveries, we must indeed marvel that so many women escape infection and we must at the same time realize how serious even a slight error of omission or commission may become.

In the Beth Israel Hospital our usual mode of procedure with the expectant parturient is to give her a cleansing bath on admission—a shower bath would perhaps be more advisable, particularly in multiparæ — shave the vulva, give a soap suds enema, scrub the pudendum and abdomen as far as the ensiform cartilage with green soap and water, flush the parts with a saline and then with bichloride 1 to 5,000. The preparation of the bed is along the customary lines, but instead of one rubber sheet we employ two, arranged in such a way that after labor is completed, the soiled upper coverings with the upper rubber sheet are removed and the patient then lies comfortably on the lower, clean coverings, protected by the rubber sheet underneath. With this arrangement the patient need be disturbed but very little. We do not, as a rule, give an ante-partum or post-partum douche. The vagina, it is generally admitted, does not harbor pathogenic germs outside of the gonococcus, which seems to thrive under the most unfavorable conditions; the acid secretion of the vagina is inimical to the harmful varieties of germs. A douche, except where there is gonorrheal infection, is at best but of questionable worth, particularly a bichloride douche. The vaginal secretion acts as a lubricant and protective to the mucosa. After a douche the mucosa becomes more vulnerable to pressure and therefore denudation is more apt to occur, particularly if the presenting part be a large occiput.

Examinations of the patient should be infrequent, for no matter how thorough our asepsis may be, the air in the room, if nothing else, is not sterile, and may prove a source of infection. We may regard this as an iron-clad rule: "The more numerous the examinations the more chances for infection." Our first examination must therefore be thorough and comprehensive; we should determine the presentation, if possible, whether engagement has taken place, the presence or absence of the cervical body, and if there be dilatation and its degree; we should note the force and frequency of the pains, the dilatability of the os, and if the true conjugate has not been previously gauged, it should be done at this time. Having determined these points, we can roughly estimate the duration of labor, and it will seldom be necessary to re-examine till the second stage of labor, announced by the rupture of the bag of waters, has been reached.

A delicate question in relation to septicemia at times arises, especially in primiparæ and in those cases where there is a slight disproportion between the size of the presenting part and the outlet of the pelvis, namely—how long shall we permit the second stage of labor to continue without interference? The presenting part pressing forcibly upon the vaginal mucosa, the bladder, rectum and perineal body, for an undue length of time, is apt to cause excoriations, a marked lowering of the vitality, even to sloughing, all of which necessarily increases the likelihood of infection. Most authorities agree that two and a half hours should be the maximum limit for the second stage of labor; if it does not terminate naturally within this time, they advise the use of the forceps. To many, the use of pituitrin would suggest itself in this contingency. I may say, in passing, that the effect of pituitrin is almost miraculous at times, but unfortunately it is manifested in multiparæ only; in primiparæ, in whom secondary inertia is most frequent, pituitrin seems almost devoid of action.

A reminder in the application of low forceps in occipital cases may not be amiss. Most authorities agree that the integrity of the maternal parts, and surely those of the fetus, is best assured when the blades are coapted over the parietal bosses, in a line as nearly parallel to the sagittal suture as possible. When rotation is complete, the pelvic and cephalic curves of the blades harmonize happily, the sagittal suture is parallel with the conjugate, and the forceps can therefore be easily applied in the usual way. When, however, the head has not yet rotated, considerable difficulty is often encountered in applying the blades over the parietal bosses. But with tact and patience it can be accomplished. This method of applying the forceps has the advantage that it does not necessitate reapplication; it does not interfere with rotation, and hence allows the fetus to be delivered with its short sub-occipito-bregmatic diameter.

A very large number, if not the largest num-

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ber, of septic cases result from lacerations of the genital tract, and all measures which tend to forestall this misadventure of delivery are essentially prophylactics of puerperal fever. In high forceps cases, unless hasty delivery is indicated, it is advisable to be very cautious with the force and direction of our traction; an axis-traction forceps should preferably be used. Rapid delivery through a poorly dilated os inevitably spells rupture of the cervix, which may at times extend into the uterus and even into the broad ligaments. If immediate delivery is imperative, as in a bad case of eclampsia, it is safer to resort to the Duehrssen cross-incision, extract and stitch. If immediate delivery is not so imperative, an *accouchement force* might be performed. From half an hour to an hour should be devoted to the dilatation of the os, depending on its rigidity. We must not feel satisfied till the cervix is dilated to its full capacity. Those powerful four-pronged cervical dilators on the market have never appealed to me. No doubt they are capable of doing the work, but there is no question but that we can gauge the force we are exerting more accurately manually than instrumentally. I will admit, however, when we are dealing with an unyielding os, we do often feel the desirability for metallic unfeeling fingers.

As to perineal lacerations, we must all agree that some are inevitable; but it is my belief that these inevitable lacerations ought to be few and far between. The perineum is an extremely dilatable body, with much give and elasticity; if we can restrain our impatience sufficiently till it has stretched to its maximum capacity, in the meantime preventing the exit of the head, many so-called inevitable lacerations might easily be prevented. We are all careful not to permit delivery during the height of a pain, but I fear that some of us, after the occiput has safely swept over the perineum, are not mindful of the fact that the chin of the infant is just as great a menace to the integrity of the perineum as the occiput itself. The forcible extension of the head before final delivery often causes the chin to knuckle into the hollow of the vagina, just below and behind the perineum, and unless the perineum is deftly slipped under the chin a laceration must follow. With the occiput and chin safely delivered, we must still be careful of the posterior shoulder, a prolific cause of rupture. Then, too, we must be mindful that an unusually large placenta has been known to cause a laceration, and in breech deliveries we must have an assistant press down upon the uterus during extraction; otherwise the arms will be brushed upward and we will experience not only the difficulty of extracting the after-coming head, but the additional work of extricating the arms; in such cases lacerations very frequently follow.

If laceration has occurred, immediate repair of the injuries is best conducive to the prevention of infection. The sensibilities of the parts are usually so dulled that a general anesthetic, for lacerations of the first and second degrees, is seldom required. But let us not be satisfied with the esthetic approximation of the external parts alone; the torn fibers of the levator ani muscles require suturing, nor should the vaginal mucosa be overlooked. The perineorrhaphy wound demands more than ordinary antiseptic care, because the lochial discharge flowing over it is pathogenic and very apt to cause infection. An efficient procedure is to flush the parts every four hours with two quarts of an antiseptic solution, such as 1 per cent. lysol, or saturated boracic acid solution.

Another prolific cause of septic infection is the retention in utero of placental tissue or pieces of membrane. It is well not to be over-hasty in resorting to a Crede; let us give the uterus at least twenty to thirty minutes to effectually separate the placenta, and under no circumstances should we yield to the temptation of applying traction to the cord. The expellent force must come from above; otherwise, if separation is not complete, the still unseparated part will surely tear off. At times the uterus contracts upon the after-coming membranes, and if we apply traction upon them they will give way. If the placenta is rotated a number of times until the membranes are twisted into a rope, and the patient is enjoined to make deep inhalations, we are usually enabled to liberate them.

In our examination of the extruded placenta and membranes, we must satisfy ourselves that there is no raw surface in the circumference of the placenta; this would indicate the retention of a part of the placenta or the presence of adventitious cotyledons. The membranes, it is well to remember, usually rupture near the placental insertion, unless ruptured artificially. In determining whether all the membranes have been expelled, we should

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not be caught napping in those rare cases where the infant is born with the proverbially lucky "caul." I have been told that a very conscientious man made a futile exploration of the uterus in his hunt for a missing piece of membrane; when at last he became mindful of the membranous omen of good fortune and saw it serenely ensconced about the baby's head, he almost collapsed with mortification.

If in spite of all our precautions some of the membranes or a piece of placenta be retained in the uterus, we ought not to trust to subsequent uterine contractions to expel the offending portions, even though they do often effect this. It is far better to pass in a thoroughly cleansed hand covered with sterile gloves and immediately remove them. I know that this practice is contrary to the teachings of some of our eminent obstetricians; but it would disturb my surgical sense, and my peace of mind as well, to leave a case knowing that the uterus is not thoroughly evacuated and that hemorrhage and possible infection might supervene.

In conclusion, permit me to say that the stringency of our ideas of asepsis depends upon the personal equation, the force of precept and example, and that of bitterly bought experience. But no matter how high our ideals may be, we must at times submit to circumstances. It would indeed be a "consummation devoutly to be wished" if we could all emulate the example of a certain professor of obstetrics who prides himself on the practice of the most classical asepsis; with the aid of a retinue of servants and a bevy of nurses he transforms the boudoir of his plutocratic patient into a veritable operating room, incidentally receiving, as I understand, a thousand dollars for his combined obstetric and engineering skill. But alas! "'Tis true, 'tis pitiful. 'Tis pitiful, 'tis true," we who obtain for our services less than half of the professor's fee (how much less is immaterial, irrelevant and inconsequential) must often dispense with the superfine trimmings of Listerism and content ourselves with the ordinary precautions and the cruder essentials of asepsis. But this need be no hindrance to us; if we are only steadfastly mindful of the fact that the long-shanked stork, the popular emblem of child-birth, always has hovering close by him the alert vulture of septicemia, we are bound to do good obstetric work even under the most unfavorable conditions.

THE TREATMENT OF ACUTE GONORRHEAL EPIDIDYMITIS.

By W. R. Jamieson, M.D., El Paso, Tex.

By various authorities acute epididymitis is computed to occur in from six to twenty per cent. of all cases of gonorrhea. The disease extends from the posterior urethra via the colliculus, the seminal vesicle and the vas deferens to the epididymis. On account of its social and economical aspect, many remedies have been devised to cure the disease as soon as possible, with as little damage to the function of the affected testicle as possible.

The symptoms of acute gonorrheal epididymitis are so well known that it will not be necessary to enumerate them. Many and ingenious have been the methods of treatment devised, but only those which I have tried and found beneficial will be mentioned here, with perhaps one or two new ones which have proven useful in the hands of others and which, at least, are recommended by their inventors.

The first essential in treatment is absolute rest in bed; indeed, the patient is usually glad to stay there. The scrotum should be elevated by a strip of adhesive plaster, three or four inches wide and stretching from thigh to thigh, on which it rests. Better still is that form of suspensory bandage known as the jock strap. If the treatment does not include wet applications, such as poultices, this is the best way of keeping the scrotum elevated and the medicament applied. Heat in some form is a very good pain reliever. Probably the best mode of applying it is by the hot flaxseed poultice to which laudanum or tobacco may be added. Twenty drops of laudanum may be sprinkled on the surface of the cataplasm, or fine-cut tobacco in the proportion of one to four may be intimately mixed with hot flaxseed and applied. The poultice should be covered with gauze and oiled silk and changed every hour. Cold in the form of an ice bag is also an excellent means of allaying pain, but some contend that it lowers the resistance of the tissues and so retards recovery. In applying it, it is usually best to have a towel or other cloth between the ice bag and the scrotum. If a bag is not handy, the ice may be pounded fine and mixed with sawdust and applied in a towel or rag. Ichthyol and mercurial ointment is a favorite application of mine in this trouble, but it has the defect of being very dirty and usually sets up a desquamative dermatitis, which, however, is not

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very troublesome. In some, and, in fact, most cases, the pain is agonizing; no position the patient assumes affords any relief, and finally he becomes so nervous and exhausted that narcotics must be used. Under these circumstances suppositories of opium or its alkaloids or subcutaneous injections of the latter must be given. I make it a rule to order a thorough purging with calomel and salts, which not only cleanses the bowels, but also reduces the pelvic congestion considerably.

Koenig produces hyperemia by the Bier method and waxes enthusiastic, while Emodi claims that only 33 per cent. of cases thus treated became sterile as against 70 per cent. treated in the usual way (*Interstate Medical Journal,* November, 1914). I have not tried this method.

While I am a firm believer in the necessity of rest in bed for all cases of acute epididymitis, occasionally a case presents where, for social or economic reasons, the patient must keep on his feet A jock strap, in which a hole has been cut in the center and just below the upper border, is placed on the patient's thighs. A dressing of ichthyol and mercurial ointment is applied thickly and covered with gauze; over it a thick layer of cotton is placed from the perineum forward over the symphysis, and a hole made at the level of the penis, which is passed through it and then through the hole in the jock strap, this being adjusted so as to elevate the scrotum.

When Wright announced to the world his great discovery of the opsonic theory of immunity, many of us thought that the cure of infectious disease was now to be accomplished by the injection of a few millions of dead bacteria. But alas and alack, this method has not worked out that way, though it has been a valuable adjunct to the treatment, and in gonorrhea it has given excellent results in a great many cases. In most instances it seems to relieve the pain and reduce the temperature, although I have not known it to shorten very much the course of the disease. The results obtained by antigonococcic serum have been about the same as with vaccine; that is, not uniformly satisfactory.

Rogers and Torey in 1906 were the first to report on its use in acute epididymitis. Swinburne is or was one of its strongest advocates. In spite of this, the treatment has never been popular. In Europe arthigon, a vaccine or bacterin prepared according to a special method and usually used intravenously, has been reported to have given excellent results, Saynisch being particularly enthusiastic over it.

But the serum treatment that is attracting marked attention is the use of antimeningococcic serum. Pissavy and Chauvet first showed experimentally its marked value, and Ramond, Chiray, Strominger and Heresco further testified to its success in the complications of gonorrhea.

Heitz-Boyer in 1913 first employed it in acute gonorrheal epididymitis, and his experience was so encouraging that many others are now using it and are enthusiastic over the results obtained. Not until recently have I used it in this affection, and as yet I have not had sufficient proof of its activity to make any statement as to its curative qualities, but I shall be pleased to report later. However, I have had an opportunity to try it in one case to clear up the attendant seminal vesiculitis; but to my mind, the procedure to be advocated for acute epididymitis at the present time is incision and drainage. Both from a social and economic standpoint, this is the treatment par excellence.

The opening of the inflamed epididymis is not new. Pirogoff in 1852 seems to have been the first to do this. In 1864, Smith reported one thousand cases in which he had punctured the epididymis and obtained satisfactory results. In 1906, Escat, Belfield and Bazet also reported cases, the last named having incised the scrotum and punctured the epididymis in some sixty-five cases in 1897, though he did not place them on record until nine years later. Hagner presented further evidence of the value of this simple operation in the *Medical Record,* October 13, 1906. His operation differs from Bazet's in that he opens the tunica vaginalis, and is as follows: An incision, 6 to 10 cm. long, is made over the epididymis, the parietal layer of the tunica is opened and the serous exudate evacuated. The testis is delivered and wrapped in warm towels. Multiple punctures with the tenotome are then made in the epididymis. If pus escapes the punctures are widened by passing a small probe in the direction of the outflow of pus with a to and fro motion. A small syringe with a blunt needle is inserted and the cavities are washed out with a bichloride solution. The testicle is restored and the tunica irrigated with bichloride solution neutralized with salt solution. The tunica is closed with a running suture of fine catgut, a cigarette drain of gauze inserted, and the skin brought together with silver

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wire, the drain passing out the lower angle of the wound. Silver foil and a sterile dressing are applied and the parts held by a T bandage.

Since then the operation has not been modified to any great extent, some preferring a rubber, others a gauze wick. Clark splits the capsule, and this procedure I have followed in four of my cases because in one recurrent case I encountered a greatly thickened capsule, making the use of a probe impracticable. In this case, under the thickened capsule, the head of the epididymis was found to be converted into a mass of spongy tissue infiltrated with pus, and most of it was scraped away. Since then I always open the capsule over the head, as the main swelling in the early stages is usually to be met there. As regards the rest of the epididymis, I puncture through the capsule. The skin wound is closed with either interrupted sutures of chromic catgut or silkworm gut, with two or three tension sutures of silkworm gut placed about three-fourths of an inch outside the border of the incision. These are tied over some rolled gauze, which tends to keep the dressing constantly in place, despite the contraction of the dartos. At the end of forty-eight hours the rubber wick is removed and the wound allowed to close.

The startling relief of the dull, sickening pain and the rapid fall in temperature are the two most prominent advantages of this operation. These, coupled with the economy of time, ought to be sufficient to induce every surgeon to resort to this procedure and every patient to submit to it. So far I have operated on five cases and the results have been uniformly good. There were no complications, unless an intestinal intoxication in one case occurring on the second day after operation can so be called. This was quickly relieved by a purgative. The average time in the hospital was about six days, except in two instances where the patients, who lived in boarding houses, preferred a longer stay in the hospital to the lack of attendance at their residences. In all cases, inside of twelve hours, the pain, temperature and malaise had disappeared and the patient was hungry.

It must be remembered, however, that with the recovery from the epididymitis, the cause thereof is not removed. There still remains the infection of the seminal vesicle. As soon as possible remedial measures against this should be instituted. Gentle massage of the vesicle and the prostate, if necessary, is commenced. Hot irrigations per rectum and per urethram assist greatly in the relief of the symptoms. Bacterins may be tried and do give satisfactory results in some instances. Some cases, however, are not benefited, and in these the antimeningococcic serum seems to have an almost specific effect. It is best administered in doses of 15 cc. given intramuscularly and repeated in three to four days, or longer. There may be some difficulty from anaphylaxis, but so far I have encountered no trouble from this cause. In all cases that I have incised and drained, serobacterins in increasing doses were given, and with one exception, improvement was noted. This case was one of the most virulent infections I have ever seen. Serobacterins even in very large doses had no effect on the seminal vesiculitis. The urine was cloudy and full of pus; the vesicle the size of a lead pencil, exuding pus on massage. On December 13, 1914, he received 15 cc. of antimeningococcic serum, repeated on the 17th, 22d and 28th. On the 17th the condition of the vesicle was much improved, the pus was decreasing and the urine clearing. Rapid improvement followed. In two weeks, the posterior complications had subsided, the strings disappeared more slowly, and the patient was discharged February 4, 1915.

SUMMARY.

1. In no other way can pain and temperature be so readily relieved as by operation.

2. From a social standpoint, operative procedure promises the best and most rapid cure of epididymitis, and is the best preventive of recurrence or exacerbation of gonorrhea from an overlooked focus in the seminal vesicle.

3. From an economic standpoint the difference between the time lost in non-operative measures and that lost through operation is markedly in favor of the latter.

4. Operation promises a much lower percentage of sterile patients, particularly in cases where it is resorted to on the appearance of the symptoms. Cunningham reports six operated cases of bilateral infection, in which two of the patients had married and had children, while two had living spermatozoa in condom specimens.

5. The epididymis returns to normal size in about two months.

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RENAL PAIN: DIAGNOSTIC AND CLINICAL SIGNIFICANCE.*

By J. BENTLEY SQUIER, M.D., New York.

Four main pathological conditions are apt to be confounded with renal lesions by reason of the symptom of pain. They are: 1. Coincident disease of the gallbladder and ducts. 2. Gastro-duodenal ulcer syndrome. 3. Appendicitis. 4. Affections of the large intestine.

The anatomical relations of the descending and retro-peritoneal portion of the duodenum overlying the pedicle and the under and lower half of the right kidney account for some atypical cases of jaundice with gastric irritability found in patients with ptotic kidneys. With these premises, one would grant that the study of the diagnostic value of renal pain offers many inherent difficulties. There must be combined with the pain symptom other associated symptoms which are necessary to complete or fill out a diagnostic group. Valuable complements to pain are the presence of pathological products in the urine, nocturnal and diurnal variations in amount, frequency of micturition, with or without tenesmus, nocturia, etc.

Most of the affections of the kidney are in the beginning painless and many of them remain so. It is known that pain as a result of changes in the parenchyma of a glandular organ is extremely rare. As evidence of this we have the various nephritides of the chronic type that do not show pain unless there is a sudden acute congestion associated with a chronic inflammation and capsular changes. In fact, it is almost an accepted dictum that it is necessary to have stretching or tearing or pressure upon the delimiting capsule of a parenchymatous organ in order to have the production of pain.

In interpreting renal pain three considerations present themselves, namely, its type, its original location, and its final location and path of radiation.

Kidney pain is of two general types: 1. True renal pain located in the flank and lumbar region, of dull, aching quality, usually of maximum intensity, of constant character and without radiation. 2. Pelvic or ureteral pain, diffusely located from the lumbar region along the iliac crest, of paroxysmal or colicky quality, of varying intensity, of intermittent character, with radiation through the inguinal region into the scrotum or rectum or onto the thigh.

In order to establish that pain is of nephrogenic origin it must be correlated with some associated findings. When this is completed the clinical picture will catalogue itself into one or other of the following groups or syndromes: Pain with pus, but without cystitis, suggesting the calculous group; pain with pus, with cystitis, suggesting the tuberculous group; pain without pus, without cystitis plus tumor, suggesting the hydronephrotic group; pain with blood, without pus, without cystitis, the neoplastic or essential hemorrhagic group. It is questionable if any inflammatory disease of the renal parenchyma *per se*, without enlargement of the kidney or encroachments into its pelvis, is associated with pain. The products of any infection, however, finding an exit into the pelvis may be retained under sufficient pressure to induce ureteral occlusion with typical calculous type of pain.

A peculiarity of true renal pain is that it never becomes paroxysmal, but is always characterized by a dull, constant aching. Stooping is not painful, but local tenderness is found. Percussion with the whole hand, so-called first percussion (Murphy), or a blow being developed by the ulnar side of the open hand (Thompson) will cause an intense, acute exacerbation of a true pain.

The pain of lumbago is very often mistaken for renal pain. It is well to remember that the pain from lumbago is worse in the morning and improves as the day goes along. It is a pain that is considerably lessened by movement and active locomotion. Pain of inflammation of the kidney is less after a night's rest and becomes progressively worse towards evening and with active locomotion. The moment that the lesion involves the renal pelvis and upper ureter there is a distinct tendency to lose the constant, aching quality of true kidney pain and to have paroxysmal and colicky attacks with a marked tendency to radiation. The line of radiation is clinically along the ureter, bladder and scrotum, but anatomically along the distribution of the ilio-hypogastric, ilio-inguinal, and genito-femoral nerves.

In pelvic and high ureteral involvement the skin of the scrotum is not painful on pressure, but the deep tissues are. In lower ureteral and adjacent regions the superficial tissues are painful

* Abstract of a paper read before the joint session of the American Gynecological Society and American Association of Genito-urinary Surgeons, May, 1915.

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with the absence of pain in the deeper tissues.

A point of extreme diagnostic value is that distention of the renal pelvis and upper third of the ureter is associated with urinary frequency, but usually without painful micturition. The development of areas of referred hyperalgesia occurs with intrarenal lesions, while extrarenal lesions, as a rule, give local pain and the absence of referred hyperalgesia.

Backache is erroneously credited to disease of the kidney, but an extended examination of cases of nephritis, acute and chronic, gives no particular evidence of pain referable to kidney trouble.

It is the author's opinion that pain production by renorenal reflex is not a proven entity, and that a more careful diagnostic search will reveal a more definite pathological condition responsible for the pain in the supposedly healthy kidney.

BLADDER FUNCTION AFTER CONFINEMENT AND AFTER GYNECOLOGICAL OPERATIONS.*

By Frederick J. Taussig, M.D., St. Louis, Mo.

Since 1902 when I published an analysis of 282 postoperative records from the clinic of Professor Wertheim, in Vienna, with a view to studying urine retention and its results, a considerable literature has accumulated upon this subject.

The present analysis of 157 puerperal and 405 postoperative cases is based largely on material in the service of my colleagues and myself at the City Hospital during the years 1913 and 1914. Accurate bedside notes have enabled me to obtain the desired information in almost every instance.

Puerperal Cases. Out of 157 puerperal cases, 6 required catheterization one or more times. This would make 3.8 per cent, as compared with Meixner, who gave 5 per cent., Waldstein, 8 per cent., and von Winckel as high as 18 per cent. Among the postoperative cases the number requiring catheterization is much larger. It reaches 94 out of a total of 405, or 23.3 per cent.

As regards the variations in those women who voided urine spontaneously after delivery, three passed it within one and one-half hours after delivery of the child. The longest interval between delivery and spontaneous micturition was 22 hours. The average of all 151 patients was a trifle over 7 hours. The shorter the labor, the more quickly did the bladder regain its normal function.

Perineal lacerations, on the other hand, did not seem to have any material influence in my series; 58 of 151 had lacerations sufficient to require one or more sutures, but they showed no delay in voiding or increased proportion of catheterization. The 87 primiparæ showed but a fraction of a per cent. difference from the 64 multiparæ in the time of first voiding urine, the figures being 7.2 hours for primiparæ and 7 hours for multiparæ. The 18 operative deliveries in the series were hardly sufficient in number to justify any deductions as to the time of spontaneous urination. They showed an average time of over 9 hours postpartum. The amount of urine voided was not given in the puerperal cases as a rule.

Normal Postoperative Cases. The 405 postoperative cases cover almost every variety of gynecological operations. Leaving aside for the present the 94 cases requiring catheterization, I find that the 311 women who urinated spontaneously, voided urine on an average at the end of 12 hours. The shortest interval after operation was 2½ hours, and the longest 33 hours. The amount of urine voided was not always in relation to the time elapsing up to the first urination. The largest amount of urine voided was 29½ ounces.

My 311 cases show that, on an average, the first micturition occurred 12 hours after operation, and that the amount voided was 6.9 ounces. A comparison of 30 cases requiring catheterization with 30 cases of spontaneous urination, 12 or more hours after operation, was made. The total urine of the catheterized cases was 395 ounces in 463 hours. The total urine of uncatheterized cases was 247 ounces in 466 hours. The total period of time elapsing since operation being practically identical, we can fairly compare the quantities voided in the two groups. On an average 13 ounces were passed on catheterization, while only 8 ounces were passed when the patient voided urine, making approximately 5 ounces of retained urine in those women who voided it. The following history will serve as an illustration:

A round ligament abdominal fixation was done in a woman thirty-two years of age, under ether anesthesia. After 15 hours she voided only 3

* Abstract of a paper read before the American Gynecological Society, May, 1915.

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ounces of urine; 5 hours later, again 3 ounces; in 30 minutes, 2 ounces; in 1 hour, 5 ounces; in 3 hours, 8 ounces, and finally in two hours, 16 ounces. Thereafter urination was normal in amount and interval of time. Summarizing, I find 6 ounces of urine voided in the first 20 hours, and 39 ounces in the following 10 hours. Only at the end of 30 hours, therefore, was the bladder function fully reestablished.

Where several operations were done on the same patient they were tabulated under each head. In my statistics of 1902 I found that the interposition operation for prolapse and the radical abdominal operation for cancer of the cervix were particularly often followed by retention of urine. Subsequent writers have confirmed these findings and the present statistics are also in accord with them.

In my series the influence of anesthesia upon the bladder function can to some degree be studied by comparing the puerperal and postoperative cases. In the puerperal group, where practically no anesthesia was required, the interval up to the first micturition was only about 7 hours, whereas in the postoperative group the interval extended to 12 hours.

The 21 cases of prolonged retention of urine (over three days) occurred 8 times after the radical cancer operation, 6 times after a perineal plastic, 3 times after prolapse operations, twice after excision of carcinoma of the vulva, and in the remaining instances without explainable cause.

The most difficult problem in retention of urine is still that following the radical cancer operation, because in practically every instance catheterization is necessary and often for a period of 6 or more days. The presence of large numbers of nerve ganglia in the perimetrial tissues of the uteri removed by Wertheim previous to 1902 induced me at that time to explain the urine retention in these cases on the basis of excision of bladder innervation.

The problem of treatment has, however, thus far proved an almost insurmountable obstacle. None of the ordinary means of stimulating bladder activity has proved successful in this group of cases. Since 1905 I have done 31 radical cervical cancer operations, and of this number only 2 were able to void urine spontaneously. Both were very early cases without involvement of the parametria. Of late I have adopted the use of a retention catheter in spite of the unfavorable reports of Sampson and Hannes. Franz, of Berlin, strongly recommends its employment. I have preferred not to use the mushroom type, as Franz, but to rely upon the ordinary catheter held in place by adhesive plaster externally. Such a catheter can be readily taken out for an hour or more every day to be resterilized. In this way pressure necrosis is prevented around the sphincter urethræ that so often attends the long use of the mushroom-formed catheter.

While there are all gradations of deficiency in bladder function after confinement and operation, we can for practical purposes divide patients into four groups: 1. Those who show at such times no appreciable difference from normal micturition. 2. Those who, while able to void urine spontaneously, do not for a day or two empty their bladders completely. 3. Those who require catheterization one or more times in the first few days, but are then able to void urine without further trouble. 4. Those with prolonged interference of bladder function, who, even when finally able to void urine after several days of catheterization, are able to expel only a part of the bladder contents.

The character of the operation, the form and amount of the anesthetic, the age of the patient, the nervousness of the individual, and the degree of sensitiveness of her bladder mucosa, are all factors that to a greater or less degree come into play in producing retention of urine, and the object of the gynecologist should be to regulate his therapy, as far as possible, in accordance with the probable factors in each case.

Clinical Aspect of Disease of Extraperitoneal Appendix Vermiformis.—Dr. A. Strauss (*Surg., Gyn. and Obst.*, September, 1915) reports five cases operated upon by Dr. E. Beer, and from a study of these and of the literature on this subject, concludes: 1. Extraperitoneal position of the appendix is not uncommon. 2. The operator must be on the alert not to miss an extraperitoneal appendix and consider that it has sloughed away or that there was none. 3. Disease of an extraperitoneal appendix may give a straightforward picture of appendicitis. 4. Or it may simulate perinephric abscess or psoas abscess. It may cause a subhepatic abscess or a fecal fistula. 5. Fetid pus obtained from an abscess incised in the right lumbar region should suggest to the operator a diseased extraperitoneal appendix as the etiological factor.

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To Contributors and Correspondents.— *Original Articles, Clinical Reports, Correspondence upon subjects of General Interest, News Items, etc., are solicited from members of the profession everywhere.*

Authors favoring us with Original Articles, should do so with the understanding that they are for exclusive publication in this Journal. Any deviation from this rule must be specially mentioned at the time of sending the manuscript.

Though not required for publication, all communications must contain the author's name and address, otherwise no attention will be paid to them.

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Editorial Department

NEW YORK, OCTOBER, 1915

QUALITIES THAT MAKE FOR SUCCESS IN EMERGENCY SURGERY.

In commenting briefly on this subject, it is our desire first of all to pay a tribute to the railway surgeon. While his work is seldom chronicled in the surgical literature of the day, so often being overshadowed by the spectacular achievements and technical feats of the surgical specialist of the larger cities, it often exhibits an originality, a degree of courage, and an ability to meet emergencies as they arise that lifts it very high in the estimation of those who know.

It is no exaggeration to say that the railway surgeon is frequently called upon to face problems under conditions that would stagger his surgical brothers in the cities. And no matter how unexpected the call or how limited his equipment at the moment, he does not procrastinate, but goes fearlessly ahead and accomplishes results that may have seemed impossible. It is this combination of courage and capacity that has placed railway surgery on its present plane.

All of those who have visited any of the clinics in any of our large hospitals recently must have been impressed with the numerous provisions made to facilitate operative procedures. When the surgeon is ready to begin the operation everything has been prepared for him, so that he can, without further thought, concentrate his mind upon the work in hand. All is quiet and orderly. The field of operation has been disinfected, a skilled anesthetist has administered the anesthetic, and a number of trained assistants, as well as a corps of nurses, are present to tender such help as may be required. His wants are to a great extent anticipated. There is no need for him to call for the desired instruments, for the assistant—familiar with the routine—is ready to hand them to him; no need to sponge a bleeding surface, for some one is at his side prepared to do even this; in fact, there is no need to do any of the multitude of little things that might distract his attention from the technic. Finally, if he is hurried, some more or less trusted assistant is ready to undertake the suturing of the wound, the application of dressings and the entire aftercare of the case.

The work of the surgical specialist is usually

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done in an operating theatre equipped with every modern appliance, under aseptic surroundings, proper ventilation and good light.

Look at the other picture. A wreck has perchance occurred on some railroad far from any town, let alone a hospital! The railroad surgeon is hastily summoned, and what does he find? Not a patient all ready and waiting on the operating table for his ministration, but a groaning, quivering, deeply shocked and often unconscious individual, laid out on the ground, or on the floor of a freight car, and covered with blood and grime. Ofttimes it is not one patient but many who require his immediate attention. This is the time that tries a doctor's soul, this is the experience that calls forth every ounce of his courage, ingenuity, fortitude and skill. Where the surgical specialist would be embarrassed by the confusion and chaos, as well as the lack of those accessories to which he has been accustomed, the experienced railway surgeon calmly pursues the tenor of his way, resourceful, self-reliant and fearless in the face of the direst emergency.

He will quickly select from train hands, bystanders or passengers, those who appeal to him as likely to render intelligent assistance. His operating room may be in an open field, on the ground, or on the floor of a dingy cabin or railroad coach, and his ingenuity must furnish the necessary equipment. Quickly the wounded part is exposed, hemorrhage arrested, and pain and shock relieved, the wound disinfected and a preliminary dressing applied, and then steps taken to transport the patient or patients to more favorable and comfortable surroundings. But if necessity demands, the modern railway surgeon never hesitates, but promptly operates at the place of accident, especially if his judgment tells him that a patient's life is at stake.

All who have passed through such experiences and have been compelled to work under such difficulties, away from equipment, assistants, etc., will concede that the problem that often confronts the railway surgeon has not been overdrawn here nor his willingness to do his duty overestimated.

It is true that railroad officials, who, in spite of present-day public clamor against them, have the welfare of their employees and patrons at heart, are doing all in their power to facilitate and render more efficient the efforts of the surgeon by the construction of hospital cars, by providing first aid requisites on all trains, by the instruction of employees in order to fit them to render proper assistance in cases of injury, the establishment of hospitals in parts of the country where none are available for long distances, etc. But notwithstanding all of the progress that has been made, the surgeon is still compelled to carry a heavy burden of personal responsibility.

In conclusion it is necessary to emphasize that no course of instruction at college, post-graduate schools or hospitals can produce a good railway or emergency surgeon. It may improve and broaden his operative technic, but the ability to meet emergencies as they arise can be acquired only by actual experience. In other words, a surgeon, no matter how well educated he may be in general medicine and surgery, must have a training in emergencies and develop a capacity of working calmly, speedily and efficiently in the face of confusion, excitement and difficulty, to become a capable railway surgeon.

AMERICAN MEDICAL EDITORS' ASSOCIATION.

The annual meeting of the American Medical Editors' Association will be held at the McAlpin Hotel, New York City, on October 18th and 19th, under the presidency of Dr. H. Edwin Lewis, of New York.

Dr. Jos. MacDonald, Jr., Secretary and Treasurer of the Association, announces that a literary program of unusual interest has been arranged. Papers of particular importance to medical editors upon subjects of momentary and future value will be presented by men of national reputation.

The annual banquet will be held on the evening of Tuesday, October 19th, at the McAlpin Hotel, and while past events have left ineffaceable and delightful memories, the coming occasion will surpass them all.

NOTE TO OUR READERS: In this number we resume the publication of Dr. Joseph J. King's series of articles on "Diseases of the Nose, Throat and Ear from the Practitioner's Viewpoint." These articles have met with much favor, and we are glad to announce that there will be no further interruptions in their publication for which various causes, especially the issuing of our special numbers on cancer and on rectal diseases, were responsible.

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Department of Railway Surgery

OFFICIAL ORGAN

THE ASSOCIATION OF SURGEONS OF THE SOUTHERN RAILWAY.
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RAILWAY SURGEONS' ASSOCIATION OF PENNSYLVANIA LINES EAST OF PITTSBURG.

Program of Eighth Annual Meeting to be Held at Hotel Martinique, New York City, October 18, 19, 20, 1915.

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MONDAY, OCTOBER 18, 1915.

Meeting of Glad Hand Committee—9 a. m.
Business Session—10 a. m.
Lunch—12 m.

Scientific Session—2 p. m.

"The Acute Abdomen Following Trauma"—Dr. George B. Kunkle, Harrisburg, Pa. Discussion opened by Dr. Joseph N. Wells, Trenton, N. J.

"The Surgeon as a First-Aid Man"—Dr. H. P. Linsz, President Surgeons' Association P. R. R. Lines West, Wheeling, W. Va. Discussion opened by Dr. H. B. King, York, Pa.

"The Effects of Leg Ulcer and Enlarged Veins upon Railroad Men"—Dr. Edward Adams, New York City. Discussion opened by Dr. J. G. Flynn, Ridgway, Pa.

"Traumatic Hernia Among Railroad Employees"—Dr. C. W. Hopkins, Chief Surgeon, Chicago & Northwestern Railway Company, Chicago, Ill. Discussion opened by Dr. A. Ullman, Baltimore, Md.

TUESDAY, OCTOBER 19, 1915.

Scientific Session—2 p. m.

"Original Uses of the Bone Graft in Traumatic Surgery"—Illustrated by Lantern—Dr. Fred H. Albee, New York City. Discussion opened by Dr. Marshall Clinton, Buffalo, N. Y.

"Surgical Diarrhea vs. Surgical Constipation"—Dr. S. G. Gant, New York City. Discussion opened by Dr. Walter Lathrop, Hazelton, Pa.

"The Doctor on the Witness Stand"—Dr. John J. O'Reilly, of The New York Bar, New York City. Discussion opened by Dr. W. H. Howell, Altoona, Pa.

"The Malingerer"—Mr. John C. Rose, Chief Claim Agent, P. R. R., Philadelphia, Pa. Discussion opened by Dr. F. G. Hartman, Lancaster, Pa.

Reception—8 p. m.

President's Address—Dr. John B. Lowman, Johnstown, Pa.

Short Talks—Officers of Pennsylvania R. R. and others.

WEDNESDAY, OCTOBER 20, 1915.

Scientific Session—2 p. m.

"Chronic Intestinal Stasis—Report of Twelve Cases, with Points of Special Interest"—Illustrated by Lantern—Dr. William Seaman Bainbridge, New York City. Discussion opened by Dr. H. T. A. Lemon, Washington, D. C.

"The Bone-Plate Problem; Conclusion from a Series of Two Hundred Cases"—Dr. William O'Neil Sherman, Chief Surgeon, Carnegie Steel Co., Pittsburgh, Pa. Discussion opened by Dr. Guy C. Boughton, Erie, Pa.

"Report on the End Results of Fractures"—Dr. John B. Walker, New York City. Discussion opened by Dr. W. B. Diefenderfer, Altoona, Pa.

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Dr. Joseph N. Wells.

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CLINICS.

New York Post-Graduate Medical School and Hospital—October 19th, 20th, 21st and 22nd. 8.30 a. m. to 12.30 p. m. For clinics at other hospitals see card.

INFORMATION.

Members of the New York and New England Association and surgeons of the P. R. R. Lines West are our guests.

Members and guests are requested to sign the registry slip immediately.

Meetings and clinics will be held promptly at the hours named.

A cordial invitation is extended to all visiting and local surgeons to attend our sessions.

The members of our Association are the guests of the New York and New England Association at its twenty-fifth anniversary, October 21st and 22nd, at the Hotel Astor.

It is earnestly desired that all members and guests bring their wives to the *reception*.

The ladies are cordially invited to all sessions.

Every member who pays his dues in *cash at this meeting* saves the Association twelve cents in exchange and postage.

COMPOUND INFECTED FRACTURES.*

By W. Earle Drennen, M.D., Birmingham, Ala.

You have doubtless heard the story of the impertinent grocery clerk, who, when the old lady asked if he had any nice, fresh eggs, replied: "Madam, all fresh eggs are nice eggs, and all nice eggs are fresh eggs." I don't mean to be impertinent when I say that, while all infected fractures are compound, not all compound fractures are infected. However, I want to present to you a few of the salient features and facts in regard to compound infected fractures which have been observed in a fairly large experience. It has been my good fortune to see and have the care of some 400 cases of this kind within the past year. Nevertheless, it is not my purpose to punish you with a long list of tabulations and statistics. It is true that a large percentage of these were fractures caused by rifle or shrapnel balls; still the cases themselves did not differ in their behavior from the ordinary compound infected fractures seen in civil and more especially railroad practice.

* First Prize Paper. Read at twentieth annual meeting of Association of Surgeons of Southern Railway, Asheville, N. C., June 2-4, 1915.

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I can remember that not long ago I regarded a compound fracture with the greatest fear lest it should become infected, and once infected it seemed to me one of the most lamentable accidents that could befall the body. While, in no way, do I wish to make light of a type of injury which is always grave, nevertheless, I am convinced that the outlook has heretofore been too gloomy. To treat intelligently, and obtain the best results in these cases, a clear conception of pathology of the condition must be always held in mind. From the rather complex and confused ideas of osteomyelitis as described and defined in text-books, the impression has gotten abroad that somehow inflammation in bone is a different thing from inflammation in other tissues. The one idea above all else I wish to convey to you is that both processes are identical. It is true that the physical characteristics of bone modify the symptoms and tend to slow the processes, but in no sense do they alter the nature or the sequence of the phenomena.

Pathologically, a compound infected fracture may be compared to a common boil or furuncle. A boil arises from pyogenic organisms gaining entrance and lodgment in the subcutaneous tissues. The usual route for the infection to take place is through an abrasion or small wound, often so small as to be microscopic. Thus, in a way, the seat of the process is, for the moment, compound in the sense that there is, or has been, a wound connecting it with the outside air. If conditions are favorable, and we shall presume that they are, the germs grow and multiply and give off products of their activity, toxins, and the tissues, in their turn, react against them. The bloodvessels dilate, the capillary circulation becomes slowed, leucocytes emigrate from the capillaries—some forming a barrier or wall about the periphery of the inflamed area to protect the surrounding tissues and guard the body as a whole, while others attack individual microorganisms and perhaps succumb in the struggle. These dead leucocytes with the addition of serum and fibrin form pus. Sometimes within and sometimes without this protective zone, is the shifting zone of nutrition, or zone of surrounding living cells. We shall see that this is the zone that most concerns us. Still further out, is the zone of irritation, where the circulation is increased, metabolism is accelerated and the powers of repair heightened.

If, at this juncture, proper drainage be instituted —that is, the small boil be incised—a drop or two of pus escapes and the tension is relieved by drainage. This permits the zone of nutrition to encroach, and healing takes place rapidly with but little or no visible loss of tissue.

If, on the other hand, drainage is not obtained, the increasing pressure within forces the zone of nutrition to withdraw more and more, and, as a consequence, the central portion of this now small abscess loses its nutrition and dies. The living cells of the zone of nutrition attack this necrotic mass at its periphery and in time cause an anatomical separation of the dead from the living.

This central necrotic mass in the boil is what the laity speak of as the core. Who amongst us, in lancing a boil, has not been asked: "Doctor, did you get the core?" Even the laity knows the value of drainage. When this central necrotic mass has been extruded, tension is relieved by drainage Then the zone of nutrition encroaches on the abscess cavity and the wound is healed by filling in from the bottom with new connective-tissue cells. The epithelium at the proper time grows across and makes the repair perfect.

In compound infected fractures it is exactly the same thing. Every such fracture constitutes an abscess cavity. The core, when it is made of bone, we call a sequestrum. The zone of irritation with its increased powers of repair, we call the involucrum, and the zone of nutrition, or zone of living cells. is formed of the innermost layer of the involucrum. As I said before, it is this shifting zone of nutrition, or zone of living cells, which concerns us most. It is up to us as surgeons in these cases whether we obtain sufficient drainage, with the resulting good nutrition of the fragments exposed within the wound and the rapid restoration to normal without loss of bone, or whether we, through lack of drainage, allow tension to increase, thereby forcing back the zone of nutrition—a condition which, unless relieved, results in the formation of a sequestrum with healing long delayed.

In operating on compound infected fractures, the important points to be observed are:

1. To make large incisions—it is usually best to make the incision so that it will be dependent.

2. To remove all loose or detached pieces of bone. The fingers form a good guide to go by—

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all that can be removed by the fingers without undue effort should be removed.

3. Irrigation should be used to mechanically cleanse the wound: In these cases, a 5 per cent. solution of benzoate of sodium can be used with advantage. This acts, first, by virtue of its hypertonicity and causes a flow of serum into the wound, thereby reversing the stream and tending to prevent toxic absorption; secondly, as a preservative of devitalized tissue, it prevents the growth of saphrophytes.

4. Drainage should be maintained by the insertion of large fenestrated rubber tubes.

5. Absolutely no foreign material of any kind, such as wire, chromic gut, or bone plates, should be employed. The use of such materials can mean nothing but trouble.

6. As to the question of amputation, the tendency is rightfully to be more and more conservative. It is wonderful when conditions are favorable what nature will do towards repairing broken and infected bones. Limbs that were formerly amputated by competent surgeons without any question as to the propriety of their action, may now more often than not be saved and restored as useful members. In fact, if the economic status of the patient is not to be considered—that is, if he is a man who does not have to have the limb amputated in order to enable him to return to work at once and can be cared for over an indefinite period of time—the question of amputation is practically decided by the question of whether the limb is viable or not. With the recent additions to our knowledge in the realm of grafting and transplanting, it is almost miraculous what good results can be obtained.

7. Tetanus antitoxin in preventive dosage should always be given in these cases. It is my practice to give this at the end of the operation when the patient is still on the table, thus obviating the discomfort attending the injection when he is conscious. It has been recently learned that wounds which have been the site of a tetanic infection, if disturbed at some subsequent time by operative procedure, are apt to cause a recurrence of the infection. This is explained by the fact that the spores of tetanus can live in the walls of wounds and sinuses, where the circulation is quite feeble, for several months. The immunity which is conferred by the use of tetanus antitoxin is a passive one and no longer obtains after the foreign serum is eliminated from the body by the excretory organs. The average duration of a passive immunity is from three to five weeks. Hence it is important when an operative procedure is to be undertaken on a wound which has been previously the site of a tetanus infection to give once more a prophylactic dose of the antitoxin the day before the contemplated operation is undertaken.

After Treatment.—The after-treatment consists of but two main things: (1) Extension, (2) the maintenance of drainage. Extension greatly improves the circulation by compressing the veins. At the same time, the skin, fasciæ and muscles are gently put on the stretch. Extension secures good position of the fragments and aids drainage by preventing the muscles and fasciæ about the wound from bagging and sagging.

If drainage is perfect, irrigations should rarely be used. They are largely a makeshift for imperfect drainage. To take the place of drainage, they must be resorted to quite often, at least every eight hours, otherwise, tension occurs in the abscess cavity and the zone of nutrition fluctuates back and forth, and good tissues, which could have been saved, are sacrificed.

HERNIA.*

By J. G. Dean, M.D., Dawson, Ga.

The subject which I have selected is one on which volumes have been written and equally much said in numerous discussions for many years. It must not be expected, therefore, that I have anything whatever new or surprising to add to what others have said so often before. It is not my purpose to present a thesis on the subject or to discuss it in detail. I am, in the main, but a general practitioner located in an ordinary town, a place limited in surgical possibilities. But, whether we are differently situated or not, wherever there are 4,000 to 5,000 people there will come to the man more or less surgically inclined opportunities to exercise whatever skill he may possess in the surgical realm.

It has fallen to my lot to have more or less to do with hernias. When I say hernia I mean usually the inguinal form, as that is most frequently observed in everyday work. One thing has impressed

* Read at fourteenth annual meeting of Association of Seaboard Air Line Railway Surgeons, Wrightsville Beach, N. C., August 16-18, 1915. Fourth Prize Paper.

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me in my observation of this trouble, viz., that the medical profession is rather lax in its duty towards the unfortunates who are subjects of this affliction. We are, in my opinion, too prone to indifference; too prone to pass with lightness the patient who consults us for this condition; too slow to insist that radical relief should be resorted to; too much inclined to neglect to caution the patient as to the proper application of a truss, if he or she is not inclined to submit to radical cure, or if there is reason why it should not be attempted. Again, it has been my observation that comparatively few doctors in a community are willing to undertake the operation for relief of an incarcerated hernia. This is a condition which not infrequently confronts almost every physician, and, when it does, he has little choice if he has proper regard for the life of his patient. As a matter of course, if there is in his community a brother physician more surgically inclined and his services can be secured, no time should be lost in obtaining them and prompt action should be taken; but it is my purpose here to contend that herniotomy is one of the surgical procedures which every physician should be fairly well, at least, prepared to undertake. It is not always possible to secure the service of the surgeon as promptly as the circumstances of the case demand. Life and death confront us here always. Which shall it be? Quick, effective work will invariably mean the preservation of life, while lack of decision, fear of our own ability, consequent delay, will mean certain death to the patient we should save. There are not many places where this operation may not with fair safety be performed. I once heard Dr. Wyeth of New York say he had as soon do an operation in a horse stable, if need be, provided the field of operation could be made clean. It is not often that this condition cannot be secured fairly well in the average abode.

When in college and listening to the professor trying to drill into the class the idea of becoming thoroughly familiar with all the anatomical coverings of hernia, fixing their several names in mind, it seemed to me that this would always prove a bugbear, for it is not so easy for the everyday practitioner to always keep in mind such technical knowledge. After all, however, the Latin names are not of so much importance as a general definite knowledge of the land-marks, as well as the very necessary knowledge that the arrangement of the fasciæ and aponeuroses must be such when the reduction of the hernia has been effected that there will be but slight liability of a recurrence. It should be easy to remember, too, that the containing sac should be extirpated as near to the abdominal outlet as possible, so that there will be less danger of return after proper closure of the abdominal ring; that is, closure to that extent if possible.

Just here I will refer to a suggestion of Dr. Dawbarn, of the New York Polyclinic, made some years ago. He said at that time that it was his practice to offer a patient on whom he was about to do a herniotomy the opportunity of having the abdominal ring entirely closed by the return of the testicle into the abdomen whence it originally came. Thus he was able, in case of consent, to make a complete closure of the ring, and a return of the hernia would be out of the question. Experience, however, has taught that this procedure is impracticable and inadvisable. There are possibilities which to the testicle thus stored away are fraught with decided risk. Suppose the patient should, for instance, contract mumps, and there should arise the not infrequent testicular complication. Suppose a gonorrheal orchitis should develop. Such grave possibilities as well as cosmetic considerations forbid a return of the testicle to the abdominal cavity.

Referring again to our duty to those who may have become either in early or in late life the subjects of hernia, I do not think we have paid the debt we owe to them unless we insist that they submit to a radical cure. So safe is this operation, so frequently is it now performed, so easy is it to place our patient in a hospital, if preferred, and in the hands of a competent surgeon, that, I repeat, we have not done our duty to our patient until we have explained all this to him and have given him or her the chance of being rid of what is a most annoying as well as a constantly dangerous condition. Many babes have been allowed to go through life with this curse upon them. Whose fault was it? That of the family doctor, as a rule. I do not mean to say there are no limitations to the operation for radical cure of hernia. As a matter of course there are patients who have other conditions that make the operation inadvisable, and we should be able to determine the contraindications. Age

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must sometimes be considered as to whether or not to operate, but here also we are left to exercise our judgment in each individual case. There are those who are too old at 40, while there are others young at 70, in whom the work may be undertaken without hesitation. Various diseases play a part in deciding as to the operation, but it is unnecessary here to refer to them. Every competent physician understands that before attempting any surgical procedure, especially of a major nature, the condition of the lungs and heart, as well as that of the kidneys, must be considered, and this frequently has a bearing upon the choice of the anesthetic to be used.

In my own experience I have found that in many cases of incarcerated hernia operation may be delayed for many hours, or sometimes even several days; but just here I have found what is referred to above, viz., the habit of some physicians of procrastinating altogether too long in this dangerous condition and to take inexcusable risks. If we would devote a little study to this subject such delays would be less apt to occur. As an illustration of such delays I will refer to three instances, all cases of different physicians, and give the results in each case.

The first case, a negro about 40 years of age, was allowed by his physician to go for about three days before deciding that an operation would be imperative. Of course, a great deal of taxis had been practiced and no small amount of damage done to the contents of the hernial sac. I was called and asked to undertake the operation. I found the patient in great distress, the abdomen very much swollen, respiration considerably accelerated, and the pulse wiry, a condition which presaged a bad result. I knew that death was certain as matters stood, and felt little hope of a successful outcome from operation, but decided to give the negro his only possible chance. On opening the sac I found that the major portion of the contents consisted of gangrenous intestine. This I resected and brought the healthy portions together, end to end, using interrupted Lembert sutures; this was before the day of the Murphy button. The sac was then ligated and tied away, the sutures which were to attach the conjoined tendon and muscular layers to Poupart's ligament inserted and the operation finished. This work was done in a negro cabin, where conveniences and asepsis were nil, so that it was necessarily slow. When over, the patient was almost in *articulo mortis* and only lived a short time.

The second case was also a negro man not far from the same age. When called to aid the attending physician in operating the strangulation had existed for more than twenty-four hours. Here was a negro cabin that was as filthy as we ever see. Cleanliness was impossible. The work, as in the first case, had to be done under very poor lamp light. We did the best we could, however, and found that while the contents of the sac were badly congested there was still enough life to risk their replacement into the cavity of the abdomen. The Bassini operation as modified by Ferguson and Coley was done. This patient had some post-operative infection, but made a very fair recovery, and there was no return of the hernia when I last heard from him several years ago, but some time after the operation.

The third case, of an especially delayed character, was that of a blacksmith, a white man about 45 years of age. This was just twelve years ago. On a Tuesday I was telephoned by the physician in charge to hold myself in readiness to operate for incarcerated hernia. I kept on the *qui vive,* but heard nothing that day, the next, nor the following, and therefore concluded that reduction of the hernia had been effected soon after I had been notified. To my surprise, on the following Sunday morning, the message came to hurry to the patient, who lived in a village seven miles away, for the purpose of doing the operation. There had been no reduction of the hernia since the first notification on Tuesday. Evidently the strangulation had not been so severe as to completely cut off the circulation and produce as much pain as is usual, or such delay would not have been practiced, for the patient was under the care of two excellent physicians; but there was, nevertheless, decided strangulation, and reduction by taxis, position, etc., had not been possible and the man had suffered a great deal.

On opening the sac in this case it was found to contain omentum. This was so engorged and swollen that it was impossible to replace it in the abdomen without making a very long incision and greatly enlarging the internal ring. Besides, I did not like the looks of a part of the exposed omentum, and concluded to exsect a portion, about 2 by 4 inches in size and about ½ inch in thickness.

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This I did, ligating all bleeding points. The remainder was then returned to the abdomen, the sac ligated and cut away, and the operation completed. This man proved a very nervous, unruly patient. He got off his bed the following day, and his physicians informed me subsequently that they were never able to keep him confined except a very limited time. He went on, however, to an uninterrupted recovery, and is to-day plying his anvil and hammer, and when last heard from had had no return of his old trouble.

As rather of a novelty I will report a case which to me has been unique. An old negro woman of my town had reached the age of about seventy or more years. She had been a subject of umbilical hernia from her earliest infancy. She was very corpulent, and much of her adipose tissue was in the region of her affliction. About the hernial protrusion there was a mass of fat of considerable size. She seemed to have not worn any form of truss, but simply "trusted to luck." Suddenly one summer day she had a fit of sneezing and *"she busted,"* which of course was followed by a frightful emptying of the contents of the old hernia. She called lustily for help. Another physician and I responded. On examination we found that we had to deal with a tissue which was of no strength whatever, simply pultaceous in nature, and we had great difficulty in restoring and retaining the hernial contents within the abdominal cavity. She failed to recover.

It has been my privilege to have done this kind of work quite a number of times. I have usually advised any patient who might be a sufferer with hernia, even if he had not had any material trouble, to not wait longer, but to go to a hospital, place himself under the care of a competent surgeon, and end a condition which could only make life unnecessarily miserable. I have never hesitated to do what I could for the immediate relief of the conditions above described, my last case occurring but a month since. This patient is doing nicely and has not had a trace of infection, though the work was done in any but aseptic surroundings.

My real object, as stated at the outset, was to call attention to what seems to me rather a laxity on the part of many of us in our duty toward those of our fellows afflicted with this annoying and dangerous trouble, and to urge that we all prepare ourselves to take care of emergencies, when left to our own resources in these cases. If I have succeeded in impressing any one of you with what I believe to be our obligation in this line of work I will feel well paid for what effort I have put forth in presenting this paper.

TRAUMATIC ANEURISM OF THE FEMORAL ARTERY: REPORT OF TWO CASES.*

By THOS. H. HANCOCK, M.D., Atlanta, Ga.

It has been observed by those who do emergency work that accidents occur in groups. We go a good while without seeing a dislocated shoulder, sometimes a year or two, but during the last two weeks we have seen three. We find in the same way fractures of the femur; we have had five under treatment at one time.

The two cases which are reported in this paper are interesting more on account of the difficulty in diagnosis and the danger in delay than the manner of treatment.

J. M. H., a street car conductor, October 18, 1912, was attracted by a crowd, and finding a dispute between another conductor and a negro, he ran up to lend his assistance, when the negro shot him through both thighs near the middle. The bullet passed through the left thigh in front of the femur and the right one behind it. He bled profusely while he was being rushed to the hospital, but the hemorrhage stopped readily when the wound was dressed, the thigh bandaged and elevated. He was given a hypodermoclysis of the normal saline solution in the pectoral tissues before I saw him. This is mentioned because I wish to say that I prefer proctoclysis by the drop method when there is no emergency and by intravenous transfusion when there has been great loss of blood, as in this case, and an immediate replacement is necessary. There were no untoward symptoms for a week or ten days, when an extensive hemorrhage occurred from the wound in the right thigh, which had been swollen greatly; this was supposed to be due to the infection carried in by the bullet and some of his clothing which had been pulled from the wound. The limb was again dressed and bandaged and the hemorrhage ceased. His condition steadily grew worse and he had another hemorrhage in a few days.

* Read at twentieth annual meeting of Association of Surgeons of Southern Railway, Asheville, N. C., June 2-4, 1915.

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Aneurism had not been suspected and we operated to ligate the artery, but when it was exposed an aneurism about the size of the fist was found. The artery was ligated and the aneurism removed. The patient made a rapid recovery and has no disability, although he complains of a numbness in the limb, possibly caused by injury to the nerves by the bullet or while removing the aneurism.

J. E. K. was assisting in capturing a burglar near Cornelia, Ga., on June 26, 1913, when he was shot in the left thigh, the femoral artery being cut into and the femur shattered. He also bled profusely before he was admitted to the hospital. The wound was dressed and the limb placed in a Hodgen's anterior splint. He had no subsequent hemorrhage, but otherwise progressed like the first case. His pulse became fast and weak and his general condition very bad. There was no bruit, but the thigh was swollen and inflamed. It soon became very apparent that if something was not done, the patient would die. We operated upon him and found the same condition as in the former case, a large femoral aneurism. The artery was tied, the aneurism removed, and the patient began to improve and had no further trouble from this source.

The diagnosis is made from the character of the injury, possibly subsequent hemorrhage, sharp pain, always swelling, and there may or may not be the expansile pulsation with bruit. If much blood has remained and clotted in the limb, the condition is harder to diagnose as the characteristic signs are absent. It has been suggested that a whizzing or whirring sound may be heard with the stethoscope, and that this sound is caused by the escape of blood through the opening into the tissues, but this was not found in these cases. I believe that there is no continual seepage, but that there may be a greater or less hemorrhage from time to time. The external wound presents the same appearance as in those cases where necrosed bone is found, in other words, the tissues treat such aneurisms as foreign bodies. They do not present the usual pulsation found in true aneurisms.

Mistaken diagnosis is not rare and they have been repeatedly incised with fatal results. They may rupture into the tissues of the thigh, or gangrene of the extremity may cause death.

Whenever aneurism is suspected an early operation should be performed and in the future I shall not delay as I did.

Last year our county physician asked me to see a prisoner, a large negro, who had a peculiar condition in his forearm. Examination showed a number of small scars such as would result from gun-shot wounds, and on questioning him we found that he had been shot. He had a considerable aneurism of the radial artery near the elbow joint. An operation was advised, but I do not know whether it was ever done or not.

I have also seen a very small aneurism of the temporal artery produced by a shot wound. A small aneurism is interesting, but a large one presents great danger and should not be looked upon lightly.

Traumatic femoral aneurisms are rare from the fact that most of the cases die from hemorrhage before they have time to develop. The mortality should be greatly reduced in those cases where surgical aid can be had immediately. The hemorrhage may be controlled by the tourniquet and the artery should be ligated at once; if it has been wounded above the origin of the profunda, the external iliac may be ligated external to the peritoneum and without the loss of the limb. Ligation of the artery above the aneurism is all that is necessary, and it is best not to remove the tumor as damage to the nerves is more apt to be done. If gangrene of the limb has commenced, a high thigh amputation should be performed at once. If the proper treatment is given, there will be a very small mortality.

Conservative surgery should not be confined to the saving of limbs alone, but more attention should be given to the saving of lives.

Let us always act before it is too late and let us never lance an aneurism.

ANNOUNCEMENT OF CLINICS.

The third winter series of public genito-urinary clinics, held by Dr. Abr. L. Wolbarst at West Side German Dispensary and Hospital, 328 West 42d street, New York, will begin on Thursday, October 7th, at 8.30 p. m., and will continue throughout the winter every Thursday evening. A similar course of clinics will also be held every Tuesday afternoon at 3 o'clock, at Beth Israel Hospital (Dispensary), Jefferson and Monroe streets, beginning Tuesday, October 5th. Physicians and medical students are invited. Interesting cases may be brought for diagnosis and conference.

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SUCCESSFUL BOX CAR SURGERY.*

By W. G. WHITE, M.D., York, S. C.

This paper is simply a narrative of a case illustrating the successful results achieved in handling it under rather adverse circumstances. During the month of March, 1913, I was hurriedly called about 10 p. m. by 'phone to meet train No. 16 to attend a woman and her child, who had been injured near Tirzah, 8 miles away—in an attempt, as I understood, on the part of the mother to commit suicide. On arrival of the train, I found this poor creature and her child huddled up in a corner of the baggage car, and an immediate examination revealed the following injuries:

The woman, a negress, aged 21 years, was badly bruised about face and body. There was a fracture of the right forearm, between wrist and elbow, the left foot and leg were crushed up to and including the knee-joint, a part of which was ground almost into sausage meat, and, in addition to all of these bodily ailments, the woman was more than six months advanced in pregnancy. Her child, a girl, about 15 months of age, had also been severely injured. The left foot was severed just above the ankle, and the leg was badly mangled nearly up to the knee-joint.

There being no special hospital facilities in our town and York being the terminal station for train No. 16, I did not have these patients removed from the baggage car at all, but had it switched off on the side-track. Having an operating table and other necessary surgical appliances brought in, we simply improvised the baggage or box-car as an operating room, using the electric lights from the engine for illumination and hot water from the engine boilers for cleansing purposes. With these preparations, we found ourselves in good shape to begin the operations. Despite the serious state of the patients, neither one of them showed any marked degree of shock, the mother appearing very callous and indifferent as to the condition of herself and child.

First anesthetizing the woman, we reduced the fractured arm and put it up in a plaster-of-Paris dressing; then with aseptic precautions we prepared the leg for operation, by giving it a thorough cleansing, drying it well and applying iodine solution, being careful to get rid of all bruised skin and muscles, thus insuring a good stump. We amputated just above the knee-joint, using round flaps, and applied a moist antiseptic dressing, which we continued to use throughout the course of the case, and, I am pleased to say, with the most excellent results. She never had but a trifle of fever, and this occurred on the third day, when labor pains set in, and she was prematurely delivered of a six and one-half months' child, but even then she developed no serious trouble, as I was very careful, using hot antiseptic vaginal douches and giving especial attention to the care of the breasts.

We also had to operate on the child, amputating the leg at the knee-joint, resorting to all necessary antiseptic precautions, as in case of the mother, and obtaining equally good results. My greatest trouble was in securing clean and desirable boarding quarters for my patients, as they were 6 or 8 miles from their home, and I desired to have them nearby where I could watch them closely and give them better attention, looking after and dressing the wounds myself, as we did not have a trained nurse to aid us.

We take special pride in presenting these cases to the Association—not for the purpose of demonstrating any new method of treatment, but simply to show how frequently the very best results are obtained even where we do not have all the paraphernalia of modern surgery to help us. In these operations, I was ably assisted by Drs. J. D. McDowell and R. H. McFadden, of York, S. C.

* Read at twentieth annual meeting of Association of Surgeons of Southern Railway, Asheville, N. C., June 2-4, 1915.

THE ASSOCIATION OF SURGEONS OF THE CHESAPEAKE & OHIO R'Y.

This Association held its second annual meeting at the Greenbrier, White Sulphur Springs, W. Va., September 3, 1915, with an attendance of 91—representing five States—out of a total of 165 surgeons. A large number were accompanied by members of their families, thus adding materially to the enjoyment of the occasion. The surgeons themselves were guests of the railway company for the day. Following invocation by Dr. M. T. Simrall, Mt. Sterling, Ky., Dr. W. T. Oppenheimer, Chief Surgeon of the C. & O. Railway, delivered an address which, in addition to matters strictly business, was characterized by his usual humor and wit. Mr. L. G. Bentley, Secretary-Treasurer of the Association, then read the minutes of the meeting for

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last year. The reading of papers on the program was the next order of business, each one of the six presented calling forth considerable discussion. Succeeding the reading of a paper by Dr. J. M. Salmon, of Ashland, Ky., on "Hernia as a Cause of Action in Railway Damage Suits," a resolution, which was adopted, was offered by Dr. Geo. Ben. Johnston, of Richmond, endorsing the paper and expressing the unanimous opinion of the Association that hernia is never traumatic.

Election of officers for the ensuing year resulted as follows: President, Dr. Southgate Leigh, Norfolk; Vice-presidents, Drs. E. H. Griswold, Peru, Ind.; R. S. Griffith, Basic, Va., and A. O. Taylor, Maysville, Ky.; and new members of the Executive Committee, Drs. O. O. Cooper, Hinton, W. Va., and O. E. Bloch, Louisville, Ky. The Chamberlin Hotel, Old Point Comfort, Va., was selected as the next place of meeting, the time to be during August, 1916.

During the stay at White Sulphur, the management, through Dr. Capito, extended the privileges of the baths and pool to all members of the Association, while the visiting ladies were entertained at tea. Especially invited guests at the meeting were Drs. D. Z. Dunott, Chief Surgeon of the Western Maryland Railway, and Wm. M. Sweet, of Philadelphia. Mr. Wm. H. White, President of the Richmond, Fredericksburg & Potomac Railway, of which company Dr. W. T. Oppenheimer is likewise Chief Surgeon, were also present and gave an informal talk.—*Va. Med. Semi-Monthly*, Sept. 10, 1915.

SEABOARD AIR LINE RAILWAY SURGEONS' ASSOCIATION.

We are informed by the Secretary of this Association, Dr. J. W. Palmer, that the Committee of Awards, appointed by the Convention at the time of the last annual meeting, has decided that the following papers were deserving of the prizes donated by the International Journal of Surgery for the four best papers read before the Association. The first prize, consisting of a handsome golden oak instrument cabinet, manufactured by the W. D. Allison Company, of Indianapolis, was awarded to Dr. L. S. Oppenheimer, of Tampa, Fla., for a paper entitled "Treatment of Tetanus"; the second prize, consisting of a white enamel surgeons' diagnostic chair, manufactured by the Max Wocher & Son Company, of Cincinnati, Ohio, to Dr. H. A. Burke, of Petersburg, Va., for a paper entitled "Fracture of the Eighth and Ninth Dorsal Vertebræ"; the third prize, consisting of a complete vaccine outfit, comprising a supply of vaccines and a syringe in handsome leather case, manufactured by George D. Sherman, M.D., of Detroit, Mich., to Dr. B. G. Allen, of Henderson, N. C., for a paper entitled "How the Company Surgeons Can Help Create a Better Feeling Between People and Railroads"; the fourth prize, consisting of a set of hand-forged knives, manufactured by the E. Schmid Company, of Indianapolis, Ind., to Dr. J. G. Dean, of Dawson, Ga., for a paper entitled "Hernia."

Surgical Gleanings

Contraindications to Surgical Intervention in Obstruction at the Vesical Neck.—Dr. Bransford Lewis (*Surg., Gyn. and Obst.*, August, 1915) says that in discussing the contra-indications to operative interference in prostatic obstructions, it must be remembered that there are numerous cases of stenosis at the neck, received and detected early enough in their developmental period to permit of success in their treatment with dilating measures. This has been clearly proved in numerous instances in his experience; and each case so proved is a living denial of the necessity of operation—in this particular case, at least. Therefore, while we are ready to subscribe to the testimony of efficacy of operative methods of relief for obstruction at the neck, we must remember that many cases may be permanently relieved without operation, and that they have a right to a trial of the more conservative methods first; while in other cases operative methods are unjustified because of the physical and other conditions prevailing. Diagnosis and discriminating judgment should govern the situation.

Pseudofracture of the Sesamoid Bones of the Big Toe.—Dr. W. W. Boardman (*Surg., Gyn. and Obst.*, September, 1915) presents the following conclusions: 1. That a congenital division of the sesamoid bones of the big toe is occasionally found, especially in the medial sesamoid. 2. That fractures of these bones may be produced by direct and indirect violence. 3. That direct or indirect violence applied to a foot with a congenitally divided sesamoid may give rise to signs and symptoms identical with those produced by fracture. 4. That true fractures may possibly be recognized by the more ragged appearance of the line of cleavage; the possible occurrence of other fractures in metatarsals or phalanges; by the absence of division in the other foot; and, finally, by the appearance of

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healing. However, none of these points but the last is absolute. 5. That the symptoms in cases of congenital division probably result from an inflammation in the metatarsophalangeal joint. 6. That rest and protection will usually give relief; this failing, operative removal may be recommended. 7. That true fractures of the sesamoids will spontaneously heal with good clinical results. Satisfactory results are also reported after operative removal.

Desiccation Treatment of Bladder Tumors.—Dr. E. L. Keyes, Jr. (*Surg., Gyn. and Obst.*, August, 1915) summarizes his views as follows: 1. Tumors of the bladder must be classified as benign or malignant in accordance with their clinical characteristics, especially their reaction to the desiccation treatment. 2. The clinical characteristics of malignancy are hardness of the tumor, intractable cystitis, and sloughing or ulceration of the tumor. 3. Multiplicity and size of tumor militate against the success of any form of treatment. The surgeon will have to decide from his own experience which cases are to be selected for desiccation, and which submitted to operation and desiccation afterward. 4. When a bladder contains more than two or three tumors we may prophesy a continual tendency to relapse, and we must insist upon the closest vigilance after apparent cure. 5. For two weeks after each treatment the patient should be within call of a physician qualified to care for either infection or hemorrhage. 6. Cures should be verified as follows: Cystoscopy must show the bladder entirely healed. Three months later cystoscopy must be repeated. One year after this it must be repeated again. Further cystoscopic verification must be made at periods of about three years. For how long the tendency to relapse continues, we do not know; but after the first year it is probably slight. 7. Death has resulted once from hemorrhage and twice from "pericystitis."

Fulguration in Treatment of Bladder Tumors.—Dr. J. T. Geraghty (*Surg., Gyn. and Obst.*, August, 1915), as the result of his experience, has found that "in only tumors which were papillomata has fulguration succeeded in destroying them, and it has been possible to destroy not only benign but malignant papillomata. The response to treatment, however, in the benign as compared with the malignant is of considerable interest. Where the tumors are cystoscopically and histologically benign the rapidity of disappearance is frequently astonishing. When, however, the papillomata are malignant the response to fulguration may be extremely slow and lead almost to discouragement. Where the histological picture is distinctly malignant one can almost positively predict that the response to fulguration will be extremely slow. Sometimes a small malignant papilloma will require many times the amount of treatment which would have been necessary to have destroyed a benign papilloma of the same size. In one case with multiple malignant papillomata covering the left lateral wall of the bladder and the tumors so fused at their surfaces that it seemed like one large tumor mass, seventy-five treatments, extending over a period of nine months, were necessary to entirely eradicate the neoplasms. The result in this case might be considered brilliant, because no radical operation could have given as complete a result. In the papillary carcinoma or sessile tumors, where infiltration of the base is always present, the chances of eradication of the tumor by this method of treatment are practically nil, although considerable symptomatic relief may at times be obtained."

Radium Treatment of Cancer.—After two years' experience with radium and thorium Dr. A. Döderlein (*Zentralbl. f. Chirurg.*, No. 12, 1915) concludes that the treatment of carcinoma with these agents far surpasses any other palliative measure. He hopes to be able to show in the future that it is superior even to operative procedures, since in 12 operable cases he has effected cures of one year's duration. The minimum dose for uterine cancer is 50 mg., but large growths may require as much as 200 to 300 mg. The period of application averages 24 hours, with repetitions at first in two and later in three or four weeks. After all subjective and objective symptoms have disappeared the patients should return every four to six weeks for examination, so that the treatment may be resumed as soon as signs of a recurrence manifest themselves. The hypertrophic forms of cancer, especially the cauliflower variety of the vaginal portion, are most easily and favorably influenced, while indurated carcinoma of the cervix is less amenable. Good results were also obtained in mammary and rectal cancer, although in the latter the resulting cicatricial stenosis may be troublesome.

Surgery of the Thyroid Gland.—Dr. J. R. Wathen (*Lancet-Clinic*, June 5, 1915) urges that in the selection of our patients for operation, we should realize that early operation, before complications have arisen, as in appendicitis, gallstones, etc., offers the best results. Those cases whose pulse is not over 120 to 130, and which, under careful preparatory treatment, can be reduced to 100 or below, and whose arterial tension is not far below normal, will usually give good results. It is that class of cases where no preliminary treatment seems to be able to make such temporary reduction which seems to be especially dangerous. Wathen has carefully studied his operated cases, and has noted that all patients in whom he was not able to reduce the pulse in preparatory treatment to below 110, had died, and he lost no patient in whom it was possible to reduce the pulse below this figure—this observation, irrespective of the original condition of the pulse when the patient entered the hospital. In other words, a patient entering the hospital with a pulse of 180, and reduced before the operation to below 110, always recovered, and one entering the hospital with a pulse of only 120 to 130, and not reduced below 110, always died. Those with intermittent pulse are the most dangerous, irrespective of the pulse rate.

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Original Articles

A NEW OPERATIVE TREATMENT OF EDEMA AND VARICES OF THE LOWER EXTREMITIES DUE TO THROMBOSIS OF THE FEMORAL VEIN. REPORT OF TWO CASES.*

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Phlebitis, one of the frequent and most feared complications of varices, may, as it is well known, be primary and the starting point of phlebectasiæ themselves.

Numerous accurate clinical observations show that aside from the mechanical causes constituting the most frequent etiological factor of venous dilatation, there are others not less important from the practical and curative point of view. Several general infections, especially typhoid, appendicitis, influenza, pneumonia, scarlatina, puerperal infection, certain septicemias and toxemias, and all those causes determining alterations in the venous walls through the action of microorganisms and their toxins, may induce phlebitis with subsequent thrombosis and secondary production of phlebectasia.

The most frequent seat of thrombosis is the common femoral vein. The deep venous circulation being thus shut off, the superficial venous network takes on the function of returning all the mass of blood in the limb, the result being venous dilatation along the course of the saphenous vein. If the obstructing thrombus undergoes canalization, the deep venous circulation is reestablished and the collateral dilated veins may return to their normal caliber; but if, on the other hand, the thrombus causes a permanent occlusion of the deep venous vessels, the superficial dilatations will also become stable and permanent. More or less diffuse dilatations, especially along the great saphenous, are thus produced which cause all the hydraulic and nutritive disturbances inherent to them, with a tendency to progress.

Professor Biondi, in his extensive clinical experience, has had occasion to observe several failures in patients operated upon by other surgeons for consecutive varices due to endophlebitis of various nature. The operation very often caused increase in edema and cyanosis, persistence of pain, and increase in the size of the ulcers, with a tendency to necrobiosis and necrosis of the margins and center; nor did the functionating power of the limb improve, so much so that he had gained the conviction never to operate in such cases but to advise only medical treatment.

The immediate relation between cause and effect would suggest the removal of the thrombus so as to reestablish the interrupted circulation of the femoral vein—a very dangerous operation, however, owing to the probable production of emboli, and moreover useless, because it has no effect on the structural alterations of the venous walls. To obviate this, the only rational means would be excision of that part of the femoral vein containing the thrombus; but granting this to be possible, how can we exclude the presence of thrombi in other parts along the lumen of the same vessel?

In our surgical clinic in general, the operation of election in cases of varices of the lower extremity is total saphenectomy, according to the method of Madelung and Trendelenburg's operation in those cases not amenable to more radical treatment.

The statistics of our clinic show that up to 1910, 85 patients had been subjected to Madelung's operation, the results both immediate and distant being almost always satisfactory; in fact, no special postoperative incidents resulted, and there were only 8 recurrences during six months' observation. Simple section of the vein, performed 33 times, gave 30 per cent. recurrences during four to ten

* Translated by Attilio Milici.

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years' observation; partial saphenectomy, 20 per cent. recurrences in 21 cases during four to eight years' observation; and finally Moreschi's operation in eleven cases gave 2 recurrences during six years' observation.

None of these operative procedures is indicated for thrombotic varices due to typhoid endophlebitis, or other such causes. The superficial venous dilatations in such cases represent channels purposely created by nature through laws of compensation, and should therefore be respected in an analogous way to the symptomatic varices of decompensated cardiac conditions. Any intervention directed toward the superficial venous network, suppressing the most important channel of venous return from the limb, would add to the disease and augment the trophic disturbances which the surgeon had intended to correct.

Neither are these the only inconveniences of such an operation; other important complications are likely to come up which may endanger not only the functional integrity of the limb, but also the very life of the patient. By operating on phlebectasiæ induced by septic thrombophlebitis, those very germs which at an earlier period, invading the circulatory system, were responsible for the phlebitis and the thrombosis, might be awakened to more activity. This will happen all the more easily if total saphenectomy is performed; the traumatic action extended to the whole limb creates a diminished resistance in the tissues we are operating on, and increases the virulence of an infective process hitherto latent and innocuous. Such a deplorable condition occurred in our clinic a short time ago in the case of a young woman, 20 years old, suffering from ulcerated phlebectasia of the right lower extremity. The patient was said to have had no infectious disease nor any other affection aside from the disturbances due to varices of the right lower extremity, which had been present for four years. The good general condition of the patient led us to perform Madelung's total saphenectomy.

On the day of the operation, symptoms of infection became manifest; the temperature, preceded by chills, rose to 40.5° C; the pulse became small and rapid (140 per minute); respiration also frequent, irregular and superficial. On the third day we removed the dressing; the limb was found uniformly edematous, red and tender; a small quantity of purulent fluid oozed from the wound which was drained with sterile gauze. Meanwhile we tried to control the general dominating infection by hypodermoclysis repeated at regular intervals, numerous subcutaneous and intravenous injections of antistreptococcic serum and colloidal silver in large doses, but they failed to arrest the fatal progress of the septicemia, and the patient, attacked also by embolic pneumonitis, succumbed twelve days after the operation.

After repeated questioning of the family and the family physician, we were given to understand that the patient, contrary to what she had told us, had had an attack of scarlatina four years before, with an absolutely benign course, slight elevations of temperature and lasting only several days.

In this observation the scarlatinal infection, four years previously, is to be considered as the principal factor of the varices and of the fatal outcome of the unavoidable infection following the operative procedure.

In these forms of phlebectasiæ Professor Biondi proposes and employs a method of treatment different from the ordinary operative measures. Basing his method on proportioning the amount of blood going to and leaving the limb, he interrupts the main arterial current by resecting between two ligatures a small portion of the superficial femoral artery, not disturbing the venous circulation both superficial and deep. This arterectomy establishes a circulatory equilibrium by interrupting the current in the main artery of the limb, just as the obliterating thrombus had done in the vein.

We may say *a priori* that such an operation is clinically possible. We know from surgical anatomy that the interruption of the superficial femoral artery has no deleterious effect on the viability of the lower extremity; the circulation in the main trunk of the deep femoral remains intact, and, moreover, in the neighborhood of the great arterial pathway there exist numerous collateral channels which sufficiently secure the nutrition of the limb itself. Two arterial groups principally form the collateral channels of the inferior aortic system: the first, consisting of the hypogastric with its branches (gluteal, sciatic, obturator, ileo-lumbar); the second, of the circumflex and the perforating (above they anastomose with the ileo-lumbar, the last lumbars and the deep circumflex iliac, below with the periarticular circle of the knee formed by the popliteal artery, anastomotica magna and an-

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terior recurrent tibial). Other secondary channels are the epigastric (anastomosing with the obturator, internal mammary and intercostals) and the abdominal of Haller and superficial pudic.

The satisfactory clinical results prove the efficacy of this operative procedure. It was performed with excellent results in two cases which I had occasion to study and follow, and which I will now describe.

Case 1. S. G., 39 years old, laborer. Nothing of importance in his family history, well built, fairly muscular, good complexion. No anomalies of the thoracic viscera; thorax normal with fair expansion; respiration somewhat roughtened in the right and left supraspinous regions. Apex beat not detectable except by percussion and found in the left fourth interspace immediately medial to the mammary line. Pulse slow, 56 per minute; arteries somewhat indurated, especially the radials. Nothing of note in abdominal examination; the inguinal region shows some large, movable and indolent glands.

During the winter of the preceding year the patient had an attack of influenza and a subsequent streptococcic infection, which kept him in bed for several months. The infection was widely localized; at first it was muscular, then intestinal and peritoneal; it then produced pneumonia and pleurisy, pericarditis, arthritis and finally phlebitis of the left lower extremity. After the general infection had subsided the limb remained elephantiatic and immovable, with sluggish circulation, especially cutaneous, and extremely and persistently tender.

Objective examination: The left lower extremity, when compared with the other, was found uniformly increased in volume. Measurement of the two limbs at corresponding points showed that the affected one was 2 cm. larger at the thigh, 4 cm. larger at the calf and 4½ cm. larger at the malleoli than the other. A diffuse edema was evident throughout the limb, more accentuated at the malleoli. In the middle third anteriorly the skin seemed slightly eroded and stained with bluish spots due to effusion of blood; this was especially marked in the lower third externally. Here there was also present an ulcer as large as a fifty-cent piece with an intensely congested center, surrounded by a marked infiltration. The entire limb was extensively varicose, especially along the internal saphenous vein, this being more pronounced when the patient assumed the erect position.

Urine normal; blood examination showed hemoglobin 80 per cent.; erythrocytes 5,420,000; leucocytes 11,260.

Diagnosis: Phlebectasiæ of the lower left extremity due to septic thrombophlebitis of the femoral vein following streptococcemia.

Operation (Prof. Biondi): Vertical incision in Scarpa's triangle along the inner border of the sartorius muscle. Having found the superficial femoral artery a small piece was resected between two ligatures. Enucleation of enlarged inguinal glands.

Postoperative course: Healing of operation wound by first intention. Progressive improvement of the local condition; general and slow disappearance of pain and edema.

After three weeks the limb was found normal, of the same volume as the other and showing no varicosities whatever. The following week the patient had perfect use of the limb and has had no inconveniences up to the present time. (Operation performed March, 1911.)

Case 2. C. A., 34 years old, housewife. Menstruated at twelve; menses irregular in quantity and appearance until she married at eighteen. She has had five pregnancies; at the last (seven years ago) she had to undergo an embryectomy on account of shoulder presentation, the operation being followed by puerperal infection. Four years ago she was operated on for bilateral salpingitis, and the year after hysterectomy was performed on account of continuous and profuse hemorrhages.

The present illness dated from seven years ago, at which time, as a result of puerperal infection, she had edema and diffuse pain along the whole left lower limb, the pain being more intense at the upper part of the thigh. Rest in bed somewhat diminished the pain and edema, but they became more marked as soon as she abandoned the horizontal position.

Objective examination: The left lower limb appeared swollen, especially from the knee down, and presented well-defined varicosities along the course of the large saphenous. At the lower third of the leg there was seen a loss of substance involving the whole circumference of the limb like a ring, with thick and irregular margins, rough and congested center, and red, freely bleeding fleshy elevations.

Nothing special in the urine.

Blood examination: Hemoglobin 80 per cent.; erythrocytes 5,828,000; leucocytes 13,950.

Diagnosis: Phlebectasiæ of the left lower ex-

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tremity due to septic thrombosis of the femoral vein, following puerperal infection.

Operation (Prof. Biondi, Dec., 1911): Ligation and resection of the superficial femoral artery as in the preceding case.

Postoperative course: Disappearance of pain, diminution of edema; notable improvement of the varicose ulcer in the leg.

About a month after the operation the limb was found dry and normal, and the patient was dismissed with perfect functional restoration. We have lately had occasion to see her again and the limb was perfectly normal.

The question at once arises: Do the results obtained permit the advisability of the method? It seems rational to us to answer in the affirmative. Without denying the necessity of further clinical evidence, I think that Biondi's operation on account of its rationality, based on just criteria of physio-pathology, and on account of the good results so far obtained, deserves to be taken into consideration in the cases for which it was devised.

From the reported observations there becomes evident, moreover, the importance of determining in every case the pathogenesis of the superficial varices of the lower extremity. Clinically it is of practical value in these cases to study the past history, which we must analyze minutely. In superficial varices following septic thrombosis of various nature, the characteristic initial picture of thrombophlebitis may not be manifest, a fact which might easily mislead the surgeon. It is absolutely necessary, therefore, to have present a preexisting thrombosis and not to perform any operation without having first established the pathogenic factor of the varices in question.

Besides the past history, other diagnostic points, as the age, occupation of the patient, and the unilateral situation of the lesion, may throw some light on the etiology of the condition. In these cases, excluding, for reasons before stated, the operative procedures now in use, there is nothing left, it seems, but one other method of treatment, and that is interruption of the circulation in the superficial femoral artery. Our patients are well at considerable intervals after the operation; they do not notice any disturbances, such as weakness or pain in walking, in the affected limb.

In conclusion, my theoretical considerations and the two clinical results just described lead me to advise ligation of the superficial femoral artery in cases of edema and varices of the lower extremity due to thrombosis of the femoral vein—an operation causing a diminution of the edema and varices, and avoiding the danger of varicose ulcers and of endo- and periphlebitis.

This new method of treatment, simple in technic and available to every surgeon, is essentially rational, free from any inconvenience and affords good hope of a radical and permanent cure.

ANESTHESIA IN BRAIN SURGERY.

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Anesthesia has made surgery possible; the success of surgery has been coincident with its advancement.

The intra-tracheal method has widened the field for intra-thoracic surgery. The use of oxygen with nitrous-oxide, ether and chloroform has made these agents more safe.

An anesthetist who has had medical training and a wide experience in the study of disease in all its phases, has watched the effects of drugs on these conditions and has knowledge of physiology, is better qualified to make a specialty of anesthesia than one without this training—the doctor anesthetist, and not the nurse or lay anesthetist.

Since 1842 (the first recorded operation performed under an anesthetic) we have progressed slowly, and we find ourselves at the present time with many different methods and complicated inhalers. It is useless to assert that we are anywhere near to the discovery of the safe and universal anesthetic. It is impossible to ever obtain the one agent or method that is applicable to all cases, for we have to deal in health and in sickness with a very complex, uncertain make-up in the human subject.

In brain and spinal surgery the anesthetic is most important. The surgeons in this field show their appreciation of this by employing one experienced in this line of work, and consider him of as much importance as they do their trained assistants.

One of the unsolved problems in the physiology and chemistry of general surgical anesthesia is the changes within the central nervous system.

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During natural sleep there is some degree of anesthesia as shown by the fact that tactile, auditory and olfactory stimuli arouse some persons and not even disturb others. There are many interesting points of similarity between artificial and natural sleep. In both we find respiration is sometimes snoring or stertorous in character. In some anesthesias the breathing is very quiet and the color normal, which is the picture of sleep in many subjects. The muscular system is relaxed, complex reflex phenomena may be shown, the eyelids are closed, and as a rule the pupils are contracted. The heat production is reduced and the output of carbonic acid gas is lessened. We also find, just prior to unconsciousness, confused ideas, and upon awakening, vivid dreams are recalled.

The theory that cerebral anemia is present in both artificial and natural sleep does not hold true. In the latter state there may be no question of a fall in arterial tension causing a reduction of blood supply to the brain. Of the three most important anesthetic agents chloroform is the only one that lowers the arterial tension. With ether and with nitrous-oxide there is no such change in blood-pressure, consequently no cerebral anemia.

At the present time there is as much difference of opinion in regard to the physiological changes which take place in the sleeping state as there is in regard to those which occur in the anesthetic state, and this shows plainly the importance of further research along these lines.

There is one interesting phenomenon in brain surgery where the patient, who has been unconscious, regains consciousness at the completion of a decompression operation, showing unquestionably that pressure was the cause of his previous condition.

Another interesting feature observed in brain surgery is that from the time the bone is removed (permitting bulging of the dura) unless you increase the depth of the anesthesia when the dura is incised, if there is much loss of fluid or bulging of the brain itself, some reflex condition results, such as a change in respiration, cough, swallowing, etc., and this does not occur in the same degree, or as often, if the patient is well anesthetized at this time.

Further research work may show that possibly with some agents there are produced a dilatation and pressure of the bloodvessels within the brain, aiding the anesthetic state.

Nitrous-oxide and oxygen should be used very rarely in brain work. The anesthesia is too superficial and uncertain in itself without morphin or Crile's method, which does not work out well in this special field of surgery. The inhaler is in the way of the operator and assistants, and the anesthetist is handicapped by being unable to control his patient without disturbing the operative field, should he meet with any difficulty. The most important defect of this method is the quickness with which the reflexes may return, making it dangerous when the dura is opened, for any change in the anesthetic state at this time which might cause straining or coughing, swallowing or struggling, might injure the cortex or cause undue bleeding, and experience has taught us that these cases as a rule cannot well afford the loss of blood.

The closed method by which nitrous-oxide oxygen is given in some cases, and at times in most all, causes venous congestion of the lungs, brain, and other organs of the body, which is an undesirable condition for brain surgery.

In spinal surgery this method is strongly contra-indicated, due to the posture of the patient. In spinal cases with much deformity, the viscera of the thorax may be greatly altered in position, so much so in some instances as to exclude thoracic breathing. The deformity and posture together with the anesthetic may easily give rise to respiratory complications. The nature of the operation produces a certain amount of surgical shock, and the anesthetist should see that he does not add any respiratory shock.

The blood changes under nitrous-oxide are still in doubt, and until further researches are made it is difficult to determine just what changes do take place.

The blood-pressure is markedly raised by pure nitrous-oxide, less with re-breathing than with valves. With oxygen there is supposed to be very little change in the arterial tension unless respiratory difficulty occurs from too deep anesthesia, when there is a fall in tension due to congestion of the pulmonary circulation, this being the cause and not the nitrous-oxide.

The urinary and kidney changes shown by Kemp in the use of nitrous-oxide are: A contraction of the renal vessels and a rapid reduction in urinary secretion. In complete narcosis albuminuria is produced to some extent.

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Chloroform is employed quite extensively by European surgeons in brain and spinal surgery. In view of the very commendable research work abroad in chloroform anesthesia and the findings which show it to be a dangerous agent compared to ether, it would seem that the latter should have replaced it to some extent.

In some cases, not clearly understood, death has occurred in the first few minutes of the induction period of chloroformization. Ambley, some twelve years ago, undertook a study of these cases, and the results did not coincide with the findings of other investigators of that time.

Some of the theories advanced are: According to Ambley chloroform has a direct action upon the cardio-inhibitory center; Durit believes that the too concentrated vapor first stimulates and then paralyzes the cardio-accelerator center of the cervico-dorsal cord. Another view is that the action of the strong vapor causes a laryngo-reflex syncope. Most experimenters in this field believe that the vagi are more actively stimulated during the induction period than during complete anesthesia.

If, during the early stage, we have a concentrated chloroform vapor that acts through the blood stream directly upon the heart muscle, depressing that organ, with a depression of the vagus center from the same cause, and added to this, a patient with an unrecognized valvular lesion or weak fatty heart muscle, it would not require a very strong vapor with a slight asphyxial condition, reflexly or otherwise, to cause death in a few minutes.

It is recognized that chloroform causes a dilatation of the heart which is independent of any asphyxia, but due to a direct action upon the heart muscle. If we thoroughly appreciate what happens in asphyxia or arrested breathing in anesthesia, we will be more cautious in our work with chloroform.

The first change is a congestion of the pulmonary circulation, if severe, producing a congestion of the right side of the heart, which if not relieved leads to a failure of this organ. The cardiac arrest is due to the poisoning of the cardiac muscle from the lack of oxygen and the heart being unable to keep up the circulation through the lungs.

It is a question in each individual case just how long the patient will be able to withstand this condition under any anesthetic. With chloroform we have an added danger due to the locking up of a very toxic agent within the lungs, to be absorbed and to still further act upon the already poisoned and embarrassed heart.

First, we have to consider the strength of the vapor. The British Medical Association has determined that a 2 per cent. vapor is sufficient to produce surgical anesthesia; in many cases much less will produce the same effect. No definite percentage can be fixed for an individual case. The surgical condition, state of the patient, age, weight, etc., will determine to some extent the strength of the vapor.

The second consideration is: Is one justified in giving any per cent. at all? Are you dealing with a patient whose condition will warrant any slight asphyxial state for even a short time? Is there any naso-pharyngeal condition that does not permit of free breathing? Any lung or heart condition contraindicating its use? Is the patient going to be placed in a position that might embarrass his breathing?

Most observers find that chloroform diminishes the power of the blood constituents to unite with oxygen and to give off carbonic acid. They also find various degrees of disintegration of the red cells. Clark[1] in his research work gives us an interesting observation where he found numerous very large phagocytes in the spleen, packed with red cells and with masses of iron containing pigment. It has been found that the red corpuscles contain most of the chloroform, and only in deep and prolonged anesthesia does the plasma take up any.

An important point is the elimination of chloroform from the system. It is found that when administration ceases the output is very rapid at first, then becomes slower. Altogether the process is much slower than assumed. In a prolonged chloroformization the danger of toxemia of the agent increases in ratio to the depth of the anesthesia and the length of administration. It is lessened by an expert anesthetist who is able to keep the patient just on the verge of relaxation as shown by early return of reflexes on removal of the chloroform. There is absolutely no question that a patient who is nearly out of the anesthesia—in some instances able to recognize those about him—is in a far safer condition, provided the anesthetic has relaxed the muscular system during the operation, than one who is four or five hours and, in some instances, much longer recovering from it.

[1] Lancet, January 21, 1911, p. 158.

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It has been shown in deep chloroform anesthesia that the oxygen content of the blood is diminished 40 per cent., and chloroform was found by Hardley[2] to render the blood very liquid and to give it a bright arterial hue.

In brain surgery the anesthetist must be removed from the field of operation so as not to interfere with the operator or assistants, and the necessary covering of the face and head with sterile towels and sheets deprives him of clearly observing the patient's condition except only by noting the pulse, the color of the hands, the circulation at the finger nails for any cyanosis and the respiration.

The position for spinal work is not the best for the administration of any anesthetic. Chloroform should be used with care. With this agent we should have the patients (as in nitrous-oxide) under absolute control and not have to think of interfering with the operation. To meet these conditions and to be able to give the operator the assurance that the patient is standing the ordeal well, chloroform will have to be dispensed with in the great majority of cases. It can be used with much more safety in a different climate than that of New York. My experience has been that in the summer months it does not have the same depressing results as in winter. Heating the vapor and overheating the operating room do not give the desired results. This leads me to believe that one has to live in a warmer climate and become acclimated to chloroform. Even under the most favorable climatic conditions we have most of the dangerous features of chloroform to contend with, i.e., early death, in some instances no signs to give you warning of approaching danger until the patient is beyond remedial help, the asphyxial element liable to occur with any anesthetic, with the locking up within the lungs of a very poisonous agent; also the toxic factor in its prolonged use with degenerative effects on the tissues and blood changes, which, it is believed, cause delayed chloroform poisoning.

Ethyl-chloride and numerous other agents employed for general anesthesia are not to be thought of in this special branch of surgery.

Ether seems to fill in the vacant space between nitrous-oxide on one side and chloroform on the other, in that it is more efficient and reliable than the former and much safer than the latter.

Ether has a more irritating effect on the mucous membranes of the respiratory passages than other agents, but this may be lessened greatly. It is the only anesthetic that has a stimulating action on the circulatory, respiratory and nervous systems, and like other stimulating drugs, if improperly used, it depresses these systems.

The blood changes during and after operation have to do with the depth of anesthesia and any interference with respiration. It is not believed that oxygen is diminished to the same extent with ether as with chloroform, and the difference of findings as regards carbonic acid output and hemolysis has not been as marked. We have to deal here with an asphyxial element rather than with the effect of ether. Many patients as a result of a reduced diet and free purgation must have some blood changes to start with. The degenerative condition, however, is only transitory and in most cases is followed by rapid regeneration and an increase in red cells. Ether therefore is not as toxic to protoplasm as chloroform and does not, if used properly, lower one's resistance to the same degree.

It was found by Pechell that there was a marked reduction in urea excretion on the day after the anesthesia and an increase on the following two days.

Ether, properly given, apparently does little damage to the kidneys. If pushed too much and continued too long we get the same effect as in a prolonged chloroformization. According to animal experiments the urinary secretion is increased during the early period, lessened or even arrested during deep narcosis, and re-established during the stage of recovery. The observations on human beings by Bovee show that with chloroform there is a steady fall in the secretion of urine from the induction period to one hour and a quarter when the minimum amount is reached, while with ether there is an increase during the first fifteen minutes, after which the secretion diminished and reaches its minimum in forty-five minutes, and from then on an increase is observed.

The urea is diminished with ether and remains normal with chloroform. It is believed by many that the former is less irritating to the renal epithelium than the latter, for it has been found that albumin and casts are present in the urine more often after chloroform than ether.

Nitrous-oxide raises and chloroform lowers the

[2] Sajous, "The Internal Secretions," Vol. I, p. 98.

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blood-pressure, while ether apparently causes very little change.

The chief dangers of nitrous-oxide and oxygen alone, or without morphin or Crile's nerve blocking, are: 1st. It is a light and uncertain anesthetic which I believe allows the operator to shock the patient. In other words, a light anesthetic where there is much manipulation of organs and tissues predisposes to shock. 2nd. The asphyxial element, by the method necessary to use this agent (closed method). 3rd. The constriction of the renal vessels. I have recently had my attention called to a case (prostatic) where nitrous-oxide oxygen was used. The patient died the following day from acute suppression of urine.

As regards chloroform, the cause of the early deaths in the induction period is at present not certain. During the operation there is the danger of an over-dose, as a very toxic agent is being used and the dose is uncertain in each individual case. The degenerative changes of the blood cells, which are believed to be a factor in producing delayed chloroform poisoning, have been noted in light, prolonged and short anesthesia.

Ether may produce some degenerative tissue changes, but with an anesthesia just short of blood saturation it does not have the lasting effect that is caused by chloroform.

It is granted by nearly all observers that ether is the safest agent we have to-day. Most of the bad results from its use have been due to the fact that we have been trying to find a method of giving it that will make it more agreeable to our subjects, losing sight of our patient in an attempt to devise something new, as shown in two of our later methods.

Safety has been my first consideration; next an endeavor to understand the patient's condition, and lastly, to make the induction and recovery periods as pleasant as safety permits. I may be criticized, and possibly justly so, for saying that I have never worked in percentage vapors and have given up the use of complicated automatic apparatus. I have never found one patient who was automatic enough to get in rhythm with some of our later day devices. I have learned to let the patient be my guide as to just how much anesthetic is needed, and whether rebreathing be suitable or the open method meets the condition better.

In taking this view of the question I cannot bring myself to teach a method that permits the apparatus to administer the anesthetic or the patient to give it to himself, as in the rectal method. My conclusions are drawn from the fact that we all know how uncertain complicated machinery is in its action, and how unreliable the gastro-intestinal tract is in doing just what it is expected to do.

The method we use in this special branch of surgery is a *heated oxygenated* ether vapor. It is not a new procedure, but one not used as often as it should be. In most of our vapor appliances the ether bottle is not large enough to meet all conditions. They all have a chloroform bottle, and when you cannot get ether vapor strong enough to keep the patient anesthetized (which is often) chloroform is used. Just this difficulty led me, two years ago, to employ a larger bottle (sixteen ounces), putting one-half pound of ether in it instead of one-quarter of a pound as in other methods. With the larger bottle there is more ether surface, hence more vapor. This I have found most satisfactory.

Heated anesthetic vapor is a much disputed subject. I am not going to burden you with any detailed experiments, but will say and can prove it clinically that any method that apparently takes the chill from the ether vapor in transit to the patient's lungs causes less irritation to the respiratory mucous membranes than vapor not so treated, as shown by less secretion, cough and respiratory trouble.

Oxygen has made nitrous-oxide a much safer anesthetic than it is in its pure state or mixed with air. It is just as important with ether and chloroform, as the latter takes up 40 per cent. of the oxygen from the blood and ether less. I am not prepared at this time to state experimentally just what percentage of oxygen is saved to the blood by its use. From clinical findings I assume that the oxygen content of the blood is very little disturbed where oxygen is employed to vaporize ether.

In using the above combination in about three hundred brain cases we have observed less irritation to the lungs. In one case, a child with a severe bronchitis, in which a decompression was necessary, as the patient was becoming comatose from a fracture of the skull, it did not increase the lung irritation. In another, a child with signs of T. B. C. posteriorly, where two anesthetics were given ten days apart, no bad results were noted for weeks

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after. In none of these cases have we used morphin or any preliminary medication. Where urinary analysis showed albumin and casts bad results from the anesthetic as regards the kidney function were not observed in a single instance.

With this method there is less respiratory trouble during the anesthesia, and I feel sure, less nausea and vomiting postoperative. I have been told so by a number of patients; one in particular where I used nitrous-oxide oxygen for the induction and continued with the heated oxygenated-ether vapor during the operation informed me that she had not smelled ether until the second day after operation, when an ether patient was taken past her room.

The position of the patient for both brain and spinal surgery is important to the anesthetist as well as to the surgeon. We use the Richardson mastoid block for brain cases, and it is so satisfactory that to go back to the sand bags again would be agony as of old.

There are other methods of using ether that have been tried out in this line of work. The only one that appeals to me is the intra-tracheal. It has no advantages over the above and one added danger, the tube in the larynx.

The intra-venous and rectal methods are far more dangerous than the intra-tracheal and all have an increased element of risk compared to the above method, so that we do not consider they have a place in this work.

With the intra-tracheal the patient has to be well under the anesthetic to insert the catheter, which I feel is necessary only for intra-thoracic surgery. The greatest difficulty anesthetists meet is to get the patient well relaxed, and when this is accomplished it is fairly easy to keep him in the same state. The dangers attending this method are: traumatism from passing the tube, the possibility of the tube being inserted into the bronchi, and in exerting too much pressure within the lungs which produces vagi irritation and resultant respiratory and circulatory trouble. In intra-thoracic surgery this danger is eliminated to a great extent. This method is a very commendable one, but I fail to see any advantage over the heated oxygenated-ether vapor which in most cases produces an even anesthesia with very little respiratory difficulty.

Intra-venous etherization has its dangers, i. e., sepsis, edema of the lungs, air embolism, thrombosis and pulmonary embolism. With care most of these are eliminated. The added amount of fluid in the circulation necessary for the carrying out of this method is not just suitable for brain surgery. However, both of these procedures have a place in surgery and in time will find their definite fields.

352 West 51st St.

A PRELIMINARY REPORT ON A NEW METHOD FOR FACILITATING INTESTINAL ANASTOMOSIS.

By M. Benmosche, M.D., Detroit, Mich.

Ease and simplicity are the key notes to perfect surgical technic. This is especially true in intestinal work—to handle as little of the gut, and that little, as gently as possible, to avoid spilling bowel contents, and to work as quickly and as accurately as your methods will allow.

With this end in view I have devised what, for want of some better term, we shall call "The Gelatine Bolus," prepared in this manner: Fifty per cent. sheet gelatine is boiled in normal saline with one per cent. trikresol, run into molds of adopted sizes, and placed in the refrigerator to set, subsequently rolled in some antiseptic powder and cut to any size or shape desired. They can be kept indefinitely at room temperature, but obviously retain their solidity better in a cool place.



Fig. 1.

Fig. 1 shows the shape I have been experimenting with. Fig. 2 shows how a resected gut is slipped over the bolus and the ends readily sutured. The handling and suturing are infinitely easier than without it, since it acts very much like the contrivance used in darning. The "bolus" is allowed to remain in situ. It will dissolve in about three hours.



Fig. 2.

In some of the experimental work done I have been surprised at the ease with which a segment of bowel can be handled with the "bolus." The range

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of applicability is self-evident. The "bolus" acts as a plug, temporarily preventing escape of contents. There are a number of other advantages which I hope will be brought out by other experimenters.

This constitutes my preliminary report, which I hope to amplify later. My object in publishing this at this early stage is to evoke the discussion and the experimental interest I believe it deserves.

310 Fine Arts Building.

SURGERY OF THE PALATE.

By TRUMAN W. BROPHY, M.D., D.D.S., F.A.C.S., Chicago, Ill.

The object to be attained in the treatment of congenital cleft palate is to establish normality. The success of the surgeon will be measured by this standard. The development of the nose, pharynx and mouth—in fact, the entire development and well-being of the patient—is dependent upon the surgeon's ability to move into contact and unite these separated parts. It is to the credit of the dental profession that the first operation for the closure of cleft palate was proposed in 1764 by a dentist.

Many names have been given to the operation upon the palate. Staphylorrhaphy, cionorrhaphy, palatorrhaphy are the names applied to the operation in which the edges of the cleft palate are sutured. Staphyloplasty is the name given to that operation in which a defective uvula is restored or in which the gap in a cleft palate is filled by a flap taken from the wall of the pharynx. Uranoplasty is the name given to any plastic procedure for the cure of a cleft palate involving the bones.

To describe congenital cleft palate operations clearly and accurately in all their phases, I desire to present the subject under various heads:

1. Cleft of the uvula.

2. Cleft of the uvula extending forward into the fibers of the levator palati and the reflected portions of the tensor palati muscles.

3. Cleft extending through the uvula and forward to the posterior border of the horizontal plates of the palatal bones.

4. Cleft extending through the entire soft palate, including partial or complete cleft of the horizontal plates of the palate bones.

5. Cleft of the entire soft palate extending through the horizontal plates of the palate bone and into the palatal processes of the maxillary bones.

6. Cleft of the entire soft palate including the hard palate as far forward as the original line of union between the palatal plates of the maxillary bones and the pre-maxillary bones.

7. Complete single cleft of the soft and hard palates. The maxillary bone is separated from the pre-maxillary bone.

8. Complete single cleft separating the entire soft palate and hard palate and the maxillary bone from the pre-maxillary bone. Almost invariably this deformity is complicated with hare-lip. The hare-lip may be partial or complete.

9. Cleft of the entire soft palate which extends irregularly half way through the hard palate. The anterior portion of the hard palate is united as far forward as the pre-maxillary bones. The pre-maxillary bones are entirely separated from the maxillary bones. This rare condition is usually complicated with double hare-lip.

10. Cleft only between the maxillary and pre-maxillary bones. It may be accompanied by hare-lip, single or double, and protruding pre-maxillary bone, which is diverted to the opposite side. It may be without lip complications.

11. Cleft completely separating both pre-maxillary bones from the maxillary bones.

12. Cleft only of the anterior one-third or one-half of the hard palate with protruding pre-maxillary bones. This condition is usually complicated with double hare-lip; partial or complete.

13. Cleft only of the alveolar process anterior to the maxillary bones, due to the non-development or absence of the pre-maxillary bones. Such cases are usually accompanied by hare-lip. Occasionally only a slight notch is found in the alveolar border. In one case in my practice it was accompanied by single hare-lip in the median line.

14. Cleft of the soft palate, partial or complete, while the hard palate is normal save for a cleft in the alveolar border. The cleft may pass through the alveolar ridge.

15. Cleft of the entire soft and hard palates extending through the alveolar ridge. The pre-maxillary bone is partially separated from the maxillary bone on the right side. This condition could be reversed, but I have never seen such a case.

In employing my operation for the closure of

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cleft palate at from one week to five months of age, I am more and more confirmed in my opinion from increased experience that this practice is justified. These operations should be done as early as practicable after birth, preferably within the first two weeks. The bones may, however, be moved together without fracture as late as the fifth month. The operation on the hard palate, when complicated with hare-lip, single or double, should be made before operating on the lip. Operations should be made in early infancy for the following reasons:

(1) The fissure in the lip enables the operator to gain more room in which to work. The approximation of the separated bones is an operation attended with difficulties far greater than those met in closing the lip, and when covered by the closed lip they are increased.

(2) The nose of a patient having single hare-lip and complete cleft palate is diverted from the median line toward the side opposite the fissure. It is carried with the long side of the bone, which always protrudes somewhat away from the center of the face; thus early operation straightens the nose at once and brings it into the median line.

(3) The cleft should be closed before ossification of the bones is far advanced, while they may be bent or moved without fracture. Bone at birth is about one-half organic matter, hence it is not difficult to bend the bones and close the cleft a few days after birth.

(4) The tissues unite kindly, and the surgical shock following the operation is not so great if it is performed within the first month as it would be later in childhood. It is a well established physiological fact that the nervous system of the child is not so well developed in early infancy as it is later; therefore, young children usually react better, and this is one of the advantages of performing the operation before the nervous system has developed to a point which would subject the child to a more severe shock. Moreover, mental apprehension is eliminated and we all know that alarm and dread are among the most powerful factors in producing shock.

(5) The operation in infancy brings into action the muscles of the palate which develop instead of becoming atrophied for want of use; hence a good velum is secured with plenty of tissue, whereas, if the operation is delayed until later in life, the muscles cannot as surely be made to subserve the same purpose as tissues which develop through natural employment. It is well known that muscular tissue is more perfectly developed through action. The muscles of a cleft palate are not normally employed. By operating at an early age the muscles are at once brought into use and their development is proportional to other tissues.

(6) Following early operation there is much less deformity, for all the tissues, bony as well as soft, are brought into normal relations and developed naturally according to accepted types. Whereas, when the operation is postponed a few years, it is very difficult to secure such results.

(7) When the palatal processes of the maxillæ are united, it will be observed that the development of the bones and the alveolar processes of the maxillæ assume a form nearly or quite normal, and when the teeth are erupted they will occlude properly with the lower ones.

(8) The most important reason for making the early operation is that when made in early infancy, first, on the cleft hard palate, second, on the lip, and, third, on the soft palate, a normal condition is established which enables the patient to speak as children do who were born without this congenital defect.

As to the advantages of the use of lead plates and silver wire sutures, the sutures do not cut out, since the lead plates extend the whole length of the cleft of the soft tissue, and as the wires are tightened, the plates make extension on the entire length of the soft parts. The holding of the edges of the fissure in contact, therefore, is not by the sutures alone, which exert pressure on so limited a portion of the tissues, but by the lead plates. These serve as a splint, rendering the palate inflexible to a very great extent. The movements, which are almost constant, are very largely suspended. The active muscles are put out of use until the edges of the cleft unite. The twisted wires bent down over the plates furnish a most excellent protection of the palate, as they are uncomfortable to the touch of the tongue, yet do not lacerate or abrade it. The contact of the tongue is not pleasant and this is very fortunate, because the patient will keep the tongue away from the palate and allow it to heal without being disturbed. Having first devised lead plates as a means of approximating and holding the borders of the cleft in contact, I am confident that

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better results can be secured by their use than by the employment of sutures alone. With the silver sutures and lead plates in position, with the edges of the cleft approximated with hair sutures, it is at once seen that for the purpose of relieving tension the making of lateral incisions through the tensor palati or any of the other palatal muscles, with all the resulting permanent injuries, is not necessary.

SUMMARY.

1. The Brophy operation for the treatment of congenital cleft of the hard palate consists in taking advantage of the opportunity offered in very early infancy to move the bones in contact when they are soft and easily bent and to carry them into their normal relations.

2. Bone, at birth, is about one-half organic matter, hence the bending and moving of the separated bones of the palate into contact may be easily accomplished.

3. To wait until the bones have become more widely separated and more highly ossified, the teeth erupted and the deformity increased, is to invite complications that should be avoided.

4. It must not be understood that these bones are crushed, as has been said by men unfamiliar with the operation. They are not crushed. To crush the bones in performing this operation within the first six months of life would be impossible. They are not broken, but, at a time in life when they are soft and flexible, they are bent and moved into correct relation.

5. This operation is attended by only slight hemorrhage as no vessels are divided. The hemorrhage which occurs is caused only by the passing of the needles and the scarifying of the borders of the cleft just before its edges are brought in contact.

6. The surgical shock is less in a young infant than it would be in an older one. The nervous system of a young child is not so well developed and is not, therefore, capable of receiving the same impressions as it is later in life. Besides, young children usually react better. Moreover, the element of mental apprehension is not present, and we know that alarm and dread are among the most powerful factors in producing shock.

7. If the muscles are brought into action early, they develop instead of atrophy; hence a good velum is secured with plenty of tissue, whereas, if the operation is undertaken later in life, the parts, not fully developed through non-use, cannot so easily be made to subserve the same purpose as tissues which develop through natural employment. It is well known that muscular tissue is more perfectly developed through action.

8. In cleft palate none of the muscles of the velum can be normally employed when the parts are ununited, hence they remain in a partially developed condition through life. By operating at an early age, these muscles are brought into use and their development is proportional to other tissues.

9. As a consequence of early operation, there is much less deformity than is the case in a later one, as all the tissues, bony as well as soft, develop naturally and according to accepted types.

10. When the palatal processes of the maxillæ are united, it will be observed that the bones in the development of the alveolar processes of the upper jaw assume a form nearly or quite normal, and when the teeth are erupted they will occlude properly with the lower ones, or nearly so. The normal relations in early infancy of the superior maxillary bones are restored by moving them together and holding them there until they unite.

11. In patients not having sufficient bony tissue to close the cleft by this operation without contracting the arch, the author has found that as time passed the bones developed and the arch spread until, when the upper teeth erupted, they occupied nearly or quite the correct relation to the lower ones.

12. The most beneficial result of the early operation is that it permits the normal development of the function of speech.

13. Realizing that there would be a great advantage in closing the entire palate in one operation, experience has shown that the best results are secured in overcoming this deformity by operating in early infancy, first upon the bones, and as soon thereafter as expedient upon the lip, and finally, when the child is from twelve to fourteen months old, upon the soft palate. By so doing normality is produced in all the parts.

14. The child operated on in early infancy will be better nourished following the operation and its general physical condition will improve rapidly.

15. It is fallacious to operate on the hare-lip before closing the palate. In cases of complete cleft of the hard palate accompanied by hare-lip, either

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single or double, the lip must not be operated upon first. One cannot, without great difficulty, close the cleft of the bones by transfixing them and secure immediate union after the hare-lip is closed.

CONGENITAL CLUB-FOOT.

By HARRIS FENTON BROWNLEE, M.D.,
Danbury, Conn.

A few years ago I began looking into the question of orthopedics, not with the idea of specializing in it, but with the hope of being able to do something for the unfortunate children who turned up occasionally in the course of my general surgical work.

I had passed these cases along because I did not understand them, was not always able to make a full diagnosis, and was not confident of my ability to properly handle them.

It finally appeared to me that most general surgeons did the same thing, probably for the same reasons; the result being that those able to pay for special treatment were taken to the larger cities to known orthopedists, while the others, unable to meet the expense, were simply not treated or treated very badly and often ineffectively.

It seems to me that the situation must be about the same in other fields. The work is unremunerative as most of the cases occur in the poorer classes, particularly among the children of the recent immigrants who live in crowded houses and are pinched in many ways before they are more comfortably situated in a new country.

The cases are protracted and tedious; one must have time to give and a real fondness both for the work and for children to make it prove attractive. Then, in order to acquire the requisite working knowledge, one must visit for a time some center where large numbers of them can be seen and handled so one may become familiar with the different conditions and their variations.

This applies more or less to all lines of surgery, but more particularly to orthopedics.

The result of my own efforts has proven of great interest to me, and I am showing here a series of pictures of one case just to actually visualise what can be accomplished in an apparently unpromising condition. They do not present anything new or original. I saw and helped to operate on many similar cases in the Lorenz clinic in Vienna, and they are probably treated every day in the large clinics of this country. Still it is an instructive and satisfactory case which was neglected for eight years, though the patient lived very near a large city where help might have been obtained.

She was eight years old when discovered in one of the public schools by the district nurse, walking as best she could on her deformed legs, as shown



Fig. 1.

in Figures 1 and 2. There had been present a double talipes varus since birth, both feet being adducted with a considerable degree of inversion; therefore a condition of congenital clubfoot due either to inherited parental stigmata or to mechanical intrauterine pressure.

In this case the paternal mentality was open to question and one other child had been frequently subject to convulsions.

Spina bifida is frequently present, but was not evident in this case. Sometimes also there is an absence of certain muscles or even bones, but in this case they were all there, but simply misshapen and misplaced.

As she began to walk she developed an acquired knock-knee on both sides, this being entirely a mechanical process not present at birth, but acquired by walking with the crippled inverted feet. Fig. 3 shows the knock-knee after the feet had been straightened.

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She came into my service at the Danbury Hospital October 1, 1913. Under anesthesia the feet were forcibly unrolled and the deformity over-corrected by hand force without cutting. It required the combined efforts of myself and my assistant to accomplish this, but when we finished both feet were soft, pliable and freely movable in all directions.

The shortened tendons and the plantar fascia offer the main resistance but either seldom need division. Steady, continuous and well directed force will usually accomplish the desired correction. The tendo Achilles, however, is too strong for such treatment, and when shortened must usually be divided.



Fig. 2.

Fixation was assured in an over-corrected position by plaster over plenty of padding, the splint being split down the front to avoid constriction from swelling.

The patient walked on the plaster splints in two weeks.

Fig. 3 shows the condition after the splints were removed four weeks later. The large callouses on the upper and outer parts of the feet upon which she walked are still visible.

On November 8, I did a double osteotomy just above the condyles of the femur for correction of the knock-knee, and Fig. 4 shows the result five weeks after the operation.

I expected to apply a brace to retain the position for a time, but the result appeared so good that I put off doing so until its need was evident. Up to now, over a year since her discharge, no brace has been required, though her feet have been massaged and exercised and her shoes carefully looked after.

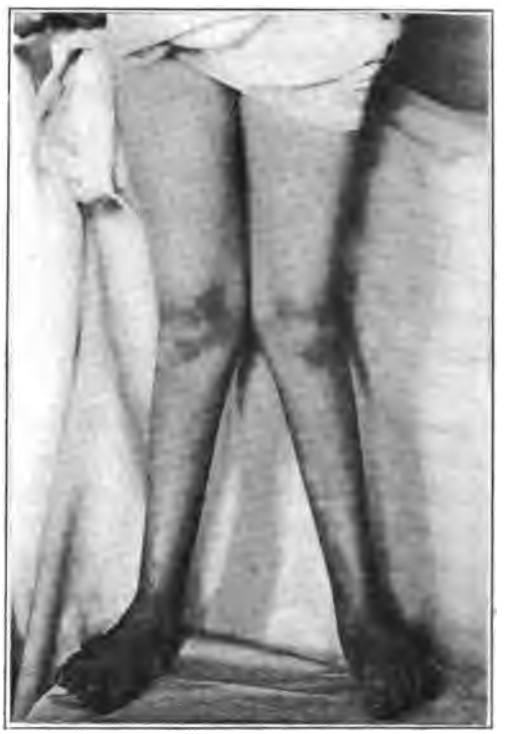


Fig. 3.



Fig. 4.

She runs and plays like other children with little or practically no difficulty.

If these cases are taken early the cure becomes

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much simpler and easier. It is a comparatively easy matter to straighten out a baby's foot with the force of a man's hand. It must be over-straightened so as to allow of some retraction. At first plaster is applied and later a simple brace which must be worn until the foot remains naturally in place without restraint. No matter how long this requires, it must simply be kept straight.

Of course, the deformities vary, the one shown being only one pure type, talipes varus with secondary knock-knee. There may be valgus, equinus, calcaneus, or combinations of two of these, as frequently occurs, and each case may present some particular point for consideration in planning the treatment.

Where muscles and their tendons are absent, a muscle and tendon can often be transplanted from some place in the foot where it can be spared to assist at the weak point, or some other surgical help may be required, but uncomplicated cases will usually completely recover if the position is corrected early and kept so.

If the operation be done before the child begins to walk knock-knee will be avoided, and the use of the muscles will do more than anything else to strengthen the weak ones and bring about symmetrical, coordinate action.

REPORT OF A CASE OF VISCERAL PTOSIS CURED BY ROVSING'S OPERATION.

By A. J. Walscheid, M.D., New York.

Adjunct Professor of Gynecology, New York Polyclinic Medical School and Hospital.

The subject of this case, Mr. F., 30 years of age, has always complained of indigestion, which manifested itself in precordial distress, eructation, and abdominal distension immediately after eating The pain was more emphasized on the right side, in the region of the hepatic flexure. Working made it worse, but it was not increased after eating or from the previously mentioned gastric symptoms.

The stomach examination by lavage was negative for both ulcer and carcinoma.

When the patient came under my observation he weighed 151 pounds, and this weight had been about the same for the last four years. The main symptoms he consulted me for were gastric disturbance and obstinate constipation, his bowels not moving without a laxative for a period of a week. He also suffered from a train of neurasthenic symptoms and concomitant psychoneuroses.

The fluoroscopic and radiographic examinations, following a bismuth meal and enema, were made by Dr. Quimby, who reported as follows:

Examination of stomach and bowel, 6-hour test, showed no 6-hour gastric residue. At 6 hours the head of the bismuth column was in the left transverse colon, and a large accumulation remained in the ileum. At 24 hours a portion had been evacuated. Fragments were in the descending colon and rectum, and a residue in the ascending and transverse colon, with a remnant in the cecum.

Patient erect—the greater curvature is 6 cm. below the umbilicus.

Patient prone—the greater curvature is 4 cm. below; pylorus, 4 cm. above and 3 cm. to the right of the umbilicus. The stomach is atonic and dilated. The pyloric antrum is deformed, and this deformity consists of irregular decrease in caliber. There are a few indentations on the greater curvature, near the fundus. The first portion of the duodenum is dilated and deformed on its right border.

The terminal ileum is freely movable. The cecum is movable and at times rests in the upper portion of the pelvis. The cecum and ascending colon are dilated. The appendix is movable and functionating. The first portion of the transverse colon cannot be retracted from the ascending colon. It is adherent. The remainder of the colon is normal.

The pelvic sigmoid consists of a moderately long loop lying transverse to the brim of the pelvis.

Diagnosis.—Gastric adhesions involving the duodenum; gastroptosis, coloptosis. Stasis in the cecum and ascending colon, due to interference at the hepatic flexure, caused by adherent bands binding the ascending and transverse colon. Redundant sigmoid.

Operation.—An incision was made from the epigastric notch to the umbilicus in the median line. Exploration of the abdominal cavity showed the gallbladder covered with membrane, involving the hepatic flexure, the entire mass being fixed in adhesions. The gallbladder was distended by constriction of its common duct by adhesion bands, and the hepatic flexure was constricted. The transverse colon was 9 inches away from the greater curvature of the stomach. The liver itself was out

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of its normal position, displaced downward. There were no adhesions at the splenic flexure, but the transverse colon and the ascending colon were bound together by a band similar to Jackson's membrane. These adhesions were freed. A series of sutures, interrupted in character, beginning beneath the pyloric end of the stomach, at the greater curvature, coaptated the transverse colon to the greater curvature toward the cardia (colopexy). The round ligament of the liver was resected from the falciform fold, cut off from its umbilical attachment, carried up and through the rectus muscle at its outer edge and the lower edge of the sternal portion of the rib, and sutured across and anterior to the rectus aponeurosis; in other words, a hepatopexy was performed. Beginning high up and to the left in the epigastric notch the first suture of silkworm gut to the stomach was carried through the abdominal wall, and entering 2 inches at the cardiac end of the stomach, at the lesser curvature, the stitch was interruptedly carried (Lembert-Czerny) across the anterior gastric wall below and along the lesser curvature to about one and one-half inches internal to the upper part of the pyloric end. Then the needle was passed through and through at the highest point and to the right of the epigastric notch. The second silkworm gut suture was placed about one-half inch below the entrance of the first, and carried, in interrupted manner, across the middle of the anterior wall of the stomach from two and one-half inches below the cardiac end, and made to emerge about one and one-half inches internal to the pyloric end between the greater and lesser curvature, terminating at the opposite side in the same way as the first stitch. The third stitch was placed about one-half inch below the entrance of the second and carried, interruptedly again, from the greater curvature of the stomach across its anterior surface, making its exit the same as the two prior stitches.

The abdomen was closed with layer sutures, a little prune juice iodine solution being rubbed on the peritoneum and anterior gastric wall to facilitate adhesions. A collodion cotton dressing was applied over the skin incision. A large roll of gauze was placed over the wound and the retention silkworm gut sutures, of heavy character, were securely tied over this gauze roll to prevent too much enfolding of the stomach wall.

The object of this operative procedure, according to Rovsing's method, is a fixation of the entire wall of the stomach to the anterior abdominal wall, known as gastropexy, the suspension of the liver by its round ligament, known as a hepatopexy, and the suturing of the upper surface of the transverse colon to the greater curvature, known as a colopexy; the adhesions, of course, being removed before any other technic is begun.

The result of the operation is as follows: The patient was operated upon nine months ago; he has increased from 151 to 160 pounds; he has no gastric disturbance; his bowels move (without any cathartic) daily—a free, copious, oily, well-formed movement.

I present this case, as I think it an excellent example of the result of Rovsing's operation for visceral ptosis, and exhibit the plates showing the man's condition before operation (the location of his stomach and bowel), and also a plate taken after the operation upon his discharge from the hospital, showing the result of the operative procedure.

I might mention that the patient made an uneventful recovery, maintaining a normal pulse and temperature.

POSTOPERATIVE RENAL INFECTION.*

By GEORGE GRAY WARD, JR., M.D., New York.

I believe that many instances of obscure and apparently unaccountable elevation of temperature, with concomitant symptoms of septic absorption occurring later in the course of a postoperative convalescence, are cases of renal infection, and they are much more frequent than was formerly believed. In the majority of cases these renal infections are of hematogenous origin and are due to the colon bacillus.

In 1906 Brewer first described as a distinct entity a type of acute hematogenous infection of the kidney which is unilateral and characterized by multiple septic infarcts. Since this publication numerous types of such cases have been reported by a number of observers, and further contributions by Brewer, Cobb and others have helped to clarify the subject and enable us to classify its variations and to aid our understanding of its pathology and symptomatology.

In studying the reports of cases of this disease

* Abstract of a paper read before the American Gynecological Society, May, 1915.

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one is struck with the frequency with which they follow some operative procedures. This is not strange when one remembers the probable causative factors and the mode of infection. The preponderance of evidence, the result of both clinical and experimental research, tends to prove that the large majority of such renal infections are hematogenous in origin, although some cases may be caused by an ascending infection either by way of the periureteral lymphatics or by extension up the lumen of the ureter.

The common association of this disease with operations upon the intestinal tract, as for appendicitis, may account for the frequency of colon bacillus infections. Anything that causes a lowered resistance of the kidney makes it a suitable soil for the bacteria which are constantly passing through it by way of the urine, whenever infection is present in some part of the body. Undoubtedly the pyelitis of pregnancy and the puerperium is but a phase of these cases of kidney infection. The condition of pregnancy predisposes to the attack on account of the pressure by the gravid uterus on the bloodvessels and ureters, causing an increased congestion and less perfect drainage of the kidneys; and the ever present colon bacillus in the neighborhood of the parturient canal and the frequency of parturient wounds supply the primary focus of infection.

There are three types of infections, depending upon the degree of virulence. They are:

1. Cases which are mild in character, the patients not being severely ill and yielding to the thorough flushing of the kidneys by the ingestion of water, formaldehyde, proper diet and rest. The virulence naturally varies according to the particular organism, the condition of the kidney, and the general bodily resistance of the patient.

2. Cases in which the kidneys contain numerous septic infarcts, and minute or microscopic foci, which are superficially situated in the cortex of the organ. Decapsulation or incision with drainage usually results in recovery.

3. The fulminating type which is characterized by a profound toxemia, and which is rapidly fatal unless a nephrectomy is done. Fortunately this form of the disease is usually unilateral.

In the treatment of mild cases of infection of the kidneys the indication for conservatism is not disputable, and in the fulminating type with the presence of abscesses we have no choice but a prompt nephrectomy. But the proper treatment of the second type of the infection cannot be so clearly defined. Much depends on the progress of the disease in each individual case, and to decide correctly when to operate and when not to operate calls for the exercise of great care in considering all the factors and sound judgment in weighing their relative value. The general principle governing the line of treatment should be that of conservatism coupled with a sharp watchfulness for signs and symptoms indicating that the point of toleration to toxic absorption has been reached by the patient, the result of lowered resistance caused by the progress of the disease.

At the outset, palliative measures, such as rest, a simple and unirritating diet, the ingestion of large quantities of pure water, with the employment of urotropin or other urinary antiseptics, should be instituted and maintained so long as the resistance of the patient is equal to the task of combatting the toxemia. Should the limit of the patient's ability to resist the disease be approached, as shown by the blood count, a continued high range of temperature and increasing pulse rate, with evident progressive loss of strength, operative interference is indicated.

If operation is necessary, nephrectomy should not be done unless the indications for it, as shown by the appearance of the kidney, are positive. A decapsulation or nephrotomy with drainage is sufficient in many cases as shown by numerous reports, especially in the colon bacillus infections.

Lilienthal was probably the first to do a nephrectomy in a case of septic kidney. He reported a striking case of bilateral hematogenous infection with recovery following a double nephrotomy in 1901.

In my paper I report a case of severe colon bacillus infection which evidently first attacked one kidney and then the other, and in which decapsulation with drainage resulted in a complete recovery.

In conclusion, I would call attention to the following points:

1. That postoperative renal infection is more frequent than has been formerly appreciated, owing to its being overlooked on account of the mild

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character of the infection in many cases, the severe types being comparatively rare.

2. That vesical irritability occurring after operation may be an important precursory sign of renal infection, and therefore should not necessarily be attributed to a cystitis caused by carelessness.

3. That a study of the urine will show the probable type of the disease present, and thus be a guide to the treatment.

4. That a careful study of the pathological condition of the kidney at the operation should be made in order that nephrectomy may be avoided, if possible.

INTESTINAL STASIS.*

By GUY CLUXTON BOUGHTON, M.D.,

Attending Surgeon, Hamot Hospital, Erie, Pa.

There can be few diseases in which the symptoms and signs are more definite or more constant, and yet this condition of intestinal stasis was not recognized or understood until Sir W. Arbuthnot Lane, of London, described it in 1901, and it is to his accurate and thoughtful observations that we owe our present knowledge of the causes, symptoms, and treatment. Mr. Lane has described the anatomical changes that lead to the disease and the secondary effects that follow.

The theories of Mr. Lane in 1901 were given little attention and were thought to be another surgical fad; however, since more time and consideration have been devoted to this subject, many important phases have been brought out by other contributors through their investigations, and many of us to this day doubt, in a measure, some of Lane's theories that almost all diseases are attributable to, or the result of, intestinal stasis.

Intestinal stasis is a chronic condition due to the retention for too long a time of the intestinal contents and the toxic absorption resulting from this undue retention, especially in the small intestine. The symptoms may be slight or severe, but they are very definite. They are:

Headache, backache, muscular pains and aching of the joints, cold hands and feet and other signs of poor circulation, poor appetite with attacks of nausea or vomiting, bad taste in the mouth and an unpleasant odor of the breath. Abdominal pain, often severe, and flatulence are always present, with attacks of abdominal distention, and there is tenderness on pressure over the abdomen, especially in certain regions, of which the right iliac fossa is the most common. Constipation is usually a marked symptom and many times fails to yield to treatment, the patient having to rely on purgative drugs and injections. General depression and lack of energy are complained of and may be so marked as to make life intolerable. The skin is stained sometimes to a deep brown color; it feels unhealthy and seems to lack elasticity, the sweat having a disagreeable odor. The breasts show some change and in the more advanced cases cystic degeneration takes place. Similar changes are produced in other glands, and at operation on these patients chronic pancreatitis is frequently found to exist; in many cases cholecystitis is present and gallstones are very often noted.

In the human subject, by adoption of the upright posture, the position of the abdominal viscera is altered fundamentally. Man gained enormous advantages thereby, but as usual, this carried with it certain disabilities, and one of the greatest of these is due to the effect of gravity, which causes the heavier of the abdominal viscera to fall and in so doing to pull upon their attachments. This tendency of the viscera to fall is accentuated by civilization, for the upright posture, whether in standing, sitting, or walking, is maintained all day, *i. e.*, for seventeen out of the twenty-four hours, and is only relaxed when the subject is in bed.

The heaviest parts of the alimentary canal are the stomach, when full of food, and the large intestine when loaded with feces, and the tendency of these organs to drop is well known. The name "visceroptosis" is often used to denote the fact that the viscera (or some of them) are prolapsed.

And again we are indebted to Sir W. A. Lane for demonstrating and explaining the mechanism of the changes brought about by the dropping of the viscera. When the viscera begin to fall they drag upon the mesentery; this results in the formation of thickened bands in the mesentery. These become so thick and strong in certain cases and in certain parts as to form supplementary mesenteries, which support the bowel and tend to prevent the dropping. The "adhesions" are entirely non-inflammatory in origin; they are brought into being as the direct result of preternatural strain. The viscera

* Read before eighth annual meeting of the Pennsylvania Railway Surgeons' Association, New York City, October 18, 19 and 20, 1915.

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would be held up uniformly, if these adhesions were equally strong in all parts. Unfortunately they are often strong in some places, weak or absent in others; consequently, the bowel is held up by them at certain points, dropped at others, thereby producing kinks which lead to some degree of obstruction. In severe cases the obstruction is extreme.

There are certain points at which these kinks are especially liable to occur when the bowel drops. Following along the digestive canal from the stomach, the first of these is met with in the third part of the duodenum, at the commencement of the jejunum. There is normally at this point a peritoneal band fixing the end of the duodenum; this band is liable to become thickened. In normal cases the jejunum continues in the line of the duodenum; in the subjects of intestinal stasis, however, it is frequently dragged down vertically, an abrupt kink being produced. Further experience has extended our knowledge of this duodenal kinking, and has shown that it is scarcely ever the primary abnormality. It is secondary to dropping of other viscera, more particularly of the lower end of the ileum. In healthy persons a bismuth meal passes through the upper parts of the small intestine at a rapid rate; it can be watched running round the coils. At the lower end, however, it encounters the ileo-cecal valve, and progress here is very much slower; hence the bismuth collects at the lower end of the ileum in a group of coils normally placed above the pelvis. These are liable to drop into the pelvis. The heavy end-coils of the ileum then drag upon their mesentery and exert a downward pull which involves the whole of the small intestine, and causes a downward traction upon the commencement of the jejunum, resulting in duodenal obstruction. This is no mere theory, for this condition has been repeatedly diagnosed beforehand and subsequently confirmed at operation. This duodenal obstruction is not a permanent condition; in slight cases it is relieved at once when the patient lies down. It is worst when the patient is compelled to remain upright for long periods, and when he is in an exhausted state.

The mechanical consequences of the kinking are very obvious when they are looked for. The first result is distention. This is greatest in the first part of the duodenum—the part which is unsupported and has a complete peritoneal covering. The next result is congestion; later followed by ulceration of the congested mucous membrane. At operation for intestinal stasis, if the duodenum be examined, it is nearly always found to show well-defined evidence of congestion; it is full, even distended, thick, red, and prominent. These appearances are seen even in patients who have never had symptoms referable to the duodenum. Very often, however, the symptoms have been severe; there has been great pain which has often been most persistent, and also vomiting. The pain is often severe long before the congestion of the duodenum has gone on to the formation of an ulcer. Pronounced radiographic evidence of duodenal obstruction due to kinking may be obtained in most cases before operation. It is necessary to bear in mind, however, that the kinking is intermittent, and is most severe when the patient is at his worst. The obstruction passes off after the patient has been kept in bed for a few days, except in severe cases, when it may persist for a week or more.

We have now to consider the changes that occur at the lower end of the ileum. A long terminal coil of the ileum rises almost vertically to the ileo-cecal entrance. This long coil is present in many cases, and leads to a varying amount of delay; in the slight cases it is freely movable and pressure upon it with the fingers may cause no pain. The discovery of a fixed point can be made with great accuracy by means of the fluorescent screen while there is bismuth in the long terminal coil of the ileum; a fixed point here is of the greatest importance, for it indicates the presence, in the particular case, of a "Lane's ileal kink." The fixity is demonstrated in three ways: Firstly, by observing the movements accompanying deep respiration, when the cecum is seen to move freely up and down, taking with it the end of the ileum, as far as this is free, while the fixed point retains its position unchanged. Secondly, by pressure with the fingers, when the part above and below the fixed point may be moved, but the deepest pressure fails to move the fixed point. Thirdly, by an examination in the upright posture, when the cecum will fall into (or toward) the pelvis, leaving the fixed point of the ileum tied up. It is in the upright posture that the effect of an ileal kink is most marked, the two portions of the terminal coil, above and below the kink, hanging down vertically and producing extreme obstruction in severe cases. As a result of the ileal stasis, bac-

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teria, normally confined to the large intestine, ascend the ileum, giving rise to decomposition of its contents.

The appendix is often involved in the newly formed bands that arise in the ileo-cecal region. It may be held at one point, so that when the patient stands and the cecum drops the appendix is hitched up at the fixed point and obstructed. Distention of the distal portion of the appendix then occurs and inflammation follows. I believe that many of the cases of chronic appendicitis which are operated upon and afterward continue to have pain are due to these bands; they may not be attached directly to the appendix, but anywhere from 8 to 10 inches away from it, and the surgeon has failed in his haste to recognize them. I also believe that many cases are operated upon for chronic appendicitis simply because the patient complains of pain in the right iliac region, while there is no evidence of any inflammatory process going on.

When there is only a slight misplacement and kinking, the stasis may be relieved by removal of the appendix and correction of the kink. In severe cases where the misplacement of the appendix is associated with kinking of the ileum, removal of the appendix fails to relieve the symptoms. Such cases have been reported by Mayo, Coffey, Bainbridge and others. The tender spot in the right iliac fossa is usually localized accurately to some point along the end-coil of the ileum; it has nothing to do with the appendix. In a good many instances one is able to go further, for a little bismuth is found to have entered the appendix. In such cases direct pressure can be brought to bear (by means of the fingers) upon the appendix, and the absence of tenderness of this organ can thus be confirmed.

The next part of the intestine in which obstruction by bands is liable to occur is the region of the hepatic flexure and just beyond, in the first part of the transverse colon, where bands sometimes arise, running from the under-surface of the liver down to the colon. This is much less common than in the cecal region, but when bands occur at the commencement of the transverse colon they may produce great obstruction. The contents of this part of the bowel are solid; hence the effect of a slight diminution of the caliber of the gut is far greater than in the case of the small intestine. If torsion of the bowel behind the fixed part occurs, the condition known as "volvulus" will be brought about.

The splenic flexure is normally fixed below the diaphragm by the costo-colic ligament. This is always a strong band, and it keeps the splenic flexure in place even when the ascending and transverse colon are dropped so that the hepatic flexure does not rise above the iliac crest, while the transverse colon hangs in a great loop, the middle of which occupies the pelvis in company with the dropped cecum, the dropped great curvature of the stomach, the dropped lower coils of the ileum, the sigmoid flexure and the rectum, all pressing upon the pelvic organs proper. In such a case there is a very long rise from the lowest part of the transverse colon to the splenic flexure, and, especially in the upright posture, feces may be retained for days in the transverse colon.

The sigmoid loop is very frequently the seat of abnormal bands or adhesions in the peritoneum; they pass down to the outer surface of the meso-sigmoid. In some cases they bind down the whole of the sigmoid, which then takes a short, straight course from the iliac crest obliquely downward and inward to the rectum. This condition is favorable to the patient unless the tube be actually narrowed by pressure of the peritoneal bands upon it; narrowing in this region causes obstruction, and diverticula may be produced communicating with the narrowed central lumen of the sigmoid. In other cases, only the ends of the sigmoid loop are fixed by bands close together, the loop itself being free and projecting into the false pelvis. Thus two kinks are produced, the lower of which is a very sharp one and may cause great obstruction. This obstruction leads to lengthening of the loop and renders it very liable to the occurrence of volvulus. In still other cases the upper part only of the sigmoid loop is fixed down; the lower part then runs without separation into the rectum, forming a long mobile tube in the pelvis.

Treatment.—Very little medication is needed in the treatment of intestinal stasis, but good hygiene and diet play a most important part, with tonics and other supportive measures. In place of cathartics, which were formerly used in faulty alimentary elimination, lubricants in the form of liquid paraffin or Russian oil give the most satisfactory results in the treatment of these cases; and

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here I might say, too much care cannot be given to the selection of this oil, for it must be free from all irritating and harmful ingredients. As regards dosage, from one-half to one tablespoonful is taken morning or night, or one-half hour before each meal. The action of the oil is mechanical, for it acts as a lubricant to the intestinal tract and as a coating to the fecal masses, thereby protecting and preventing irritation and abrasion of the mucous membrane. It is not absorbed or digested as it passes through the intestinal tract and is not decomposed.

Many cases in spite of careful medical treatment may progress to a stage of chronic intestinal stasis, and then it becomes necessary to perform a laparotomy for the purpose of removing bands, veils and folds, straightening kinks, and even in these patients the above treatment should be used before and after operation.

810 Peach St.

DISEASES OF THE NOSE, THROAT AND EAR FROM THE PRACTITIONER'S VIEWPOINT.

By James Joseph King, A.B., M.D., New York.

Attending Laryngologist, Hospital for Ruptured and Crippled; Chief-of-Clinic, Ear, Nose and Throat, Gouverneur Hospital; Assistant Surgeon in Otology, New York Eye and Ear Infirmary.

(*Continued from October Issue.*)

SYPHILIS OF THE NASO-PHARYNX.

The epipharynx may be the seat of secondary or tertiary syphilis. Where there are many mucous patches in the mouth and on the pharynx, some will probably be present in the naso-pharynx. Gummata may also be found in this region.

Symptoms.—The symptoms of syphilis of the naso-pharynx are those of acute naso-pharyngitis, and the patches can be recognized only by posterior rhinoscopy.

Gummata are occasionally found on the walls of the naso-pharynx. They vary in size, but may be as large as a small marble, and cause considerable pain referred to the back part of the throat and the occipital region of the head. Their size may be sufficient to press forward the soft palate, and to prevent the proper occlusion of this cavity during deglutition. In this case there will be regurgitation of fluids out through the nose in swallowing. When they break down they cause pain on swallowing, and there is a discharge into the pharynx. A large ulcer in this region may produce necrosis of the posterior wall of the soft palate, and granulations may spring up and unite the soft palate to the lower portion of the naso-pharyngeal wall.

Diagnosis.—In the case of mucous patches or gummata, posterior rhinoscopy will reveal ulceration in the former and an enlargement or tumor in the latter. The history of syphilis some years previously and other evidences of secondary or tertiary lesions usually suffice to make the diagnosis clear. A positive Wassermann reaction will make it certain.

Treatment. — The treatment should be both local and constitutional. The local treatment consists in keeping the naso-pharynx clean by means of sprays or douches. One of the best douches for this purpose is one drachm each of sodium chloride and sodium bicarbonate to a pint of water at 110° F. The ulcers should be cauterized every other day with nitrate of silver fused on a curved applicator. Great care should be exercised so as not to touch the posterior wall of the soft palate, as to do so would produce excoriation and possibly a fusion of this tissue with the posterior pharyngeal wall.

The constitutional treatment is the same as for syphilis in other regions. The author's practice is to give potassium iodide internally in saturated solution, beginning with 15 drops in a glassful of water after each meal, and increasing the dosage one drop after each meal until tolerance is reached. Some patients will take 150 or 200 grains three times a day without manifesting any signs of iodism, when given in this manner. When tolerance is reached, the drug is stopped until all symptoms disappear, when it is started again with 15 drops and increased in a similar manner. In addition to this, mercury in the form of salicylate of mercury suspended in sterile liquid albolene is given by deep intramuscular injections into the buttocks. One grain of the salicylate of mercury is administered at first. It is gradually increased up to two grains, alternating the sides of the body, until constitutional symptoms are produced. The injections are given at intervals of four to seven days.

Neosalvarsan and salvarsan are useful adjuvants in the treatment of syphilis. Better results are obtained by administering the iodides and mercury in the manner described, and then neosalvarsan and

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salvarsan, than by the use of either alone. Neosalvarsan and salvarsan are given intravenously in salt solution, at first in the smallest doses, and after an interval of a few weeks larger doses are employed intravenously. In this way the dangers attending the use of these powerful preparations are reduced to a minimum.

FOREIGN BODIES IN THE NASO-PHARYNX.

These are usually particles of food that have lodged here during vomiting. Sometimes metallic substances may be regurgitated and lodged in the naso-pharynx, usually only in those in whom paralysis of the muscles of the soft palate exists.

Symptoms.—The patient generally knows when there is a foreign substance in his naso-pharynx, and applies to a physician for relief. If it is of sufficient size it will cause sudden obstruction to nasal respiration, and produce an uncomfortable feeling.

Treatment.—The foreign body should be seized with a pair of curved forceps and removed. They are passed through the mouth behind the velum of the soft palate, and once seized it is little trouble to extricate the offending substance.

BENIGN NEOPLASMS OF THE NASO-PHARYNX.

Polypi and fibromata are the most frequently observed benign tumors of the naso-pharynx. Papillomata, adenomata, chondromata and angiomata have also been found here.

Polypi in the naso-pharynx are probably due to an irritating discharge over this region, just as polypi in the nose are caused by ethmoiditis. As a rule, they occur earlier in life than nasal polypi. most often between the fifth and twenty-fifth year. They may be found in those who have nasal polypi, and their preference seems to be for the male sex.

They usually have their attachment on the lateral walls of the naso-pharynx. Their structure differs from nasal polypi in that they have a firmer and denser connective tissue and are not so edematous. Polypi arising in the posterior naris may project into the naso-pharynx, and meeting no resistance here may become so large as to completely fill up this cavity. They often become cystic with only a shell of connective tissue around them. It is sometimes difficult, on account of their size, for the examiner to accurately determine their attachment—whether to the mucosa of the nasal chamber or of the naso-pharynx.

Symptoms.—The symptoms are those due to obstruction to nasal respiration. The tumors produce mouth breathing and its train of symptoms. The patients sleep with their mouths open, snore during sleep, and are restless. In the morning they awake with dry throats, little refreshed by their sleep. Unless the tumor is so large as to completely obstruct nasal respiration, some air may be inhaled upon deep inspiration. If, however, the patient exhales, the growth is forced up against the choanæ completely blocking nasal expiration. There is a muco-purulent discharge from the nose and throat. Bleeding is easily induced. The voice has a nasal twang. The presence of such a neoplasm interferes with the rarefaction of air in and around the Eustachian tubes, and this, together with the mechanical obstruction to the tubes, produces tubo-tympanitis and catarrhal and suppurating middle ear disease.

Diagnosis.—The diagnosis is made by anterior and posterior rhinoscopy. Upon posterior rhinoscopy a tumor similar in character to a nasal polypus is seen more or less completely filling up the naso-pharynx. If any portion of it has been pressed up into the choanæ, this part may be seen by anterior rhinoscopy. If it is so large that its attachment cannot be determined by the mirror, the finger should be introduced into the naso-pharynx to locate this attachment. The tumor will be felt to be soft, yielding, freely movable, and attached to either the mucosa of the nasal or pharyngeal wall by a small pedicle.

The growth must be differentiated from hypertrophy of the posterior tips of the inferior turbinates, from other benign tumors of the naso-pharynx, and from malignant growths in this region.

Other benign tumors are brighter red in appearance, more irregular in outline, and bleed more freely upon manipulating. Hemorrhage from other non-malignant neoplasms is more frequent and more severe than from polypi.

They may be differentiated from posterior tips of inferior turbinated bones by locating their attachment. Posterior tips are found in the anterior portion of the naso-pharynx in a position corresponding to that of the inferior turbinated bone.

Polypi may be mistaken for sarcoma and carci-

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noma, especially in the early stages of malignancy. The pain, the cachexia, the lymphatic involvement, and the rapid growth in malignant disease in a few weeks will tend to a correct diagnosis. These symptoms, together with the age of the patient, the fetid discharge of cancer, and its tendency to profuse hemorrhage, will leave little doubt as to the character of the growth.

Treatment.—The polypi should be snared off with a cold wire snare. The parts are anesthetized by applying a solution of 20 per cent. cocain to them. The nose should be cocainized as well as the seat of the pedicle. After the pedicle has been located and cocainized, the snare with its loop in the horizontal position is passed through the nose. The polypus is engaged in the loop with the assistance of the forefinger of the left hand passed behind the soft palate. The growth is then slowly cut off at its pedicle by drawing home the snare. If it is slowly removed, *i. e.*, if one or two minutes' time is spent in cutting off the pedicle, the hemorrhage will be very much less than when it is rapidly excised. The site of the stump should be examined with a mirror, and if it is not entirely removed by the snare, the rest may be taken off with a pair of strong curved forceps.

The after-treatment consists in keeping the nose and naso-pharynx clean by douching with bland antiseptic solutions.

AMERICAN MEDICAL EDITORS' ASSOCIATION.

The 46th annual meeting of the American Medical Editors' Association was held October 18th and 19th at the McAlpin Hotel, New York City, under the presidency of Dr. H. Edwin Lewis, Editor of *American Medicine.* The following papers on timely and instructive subjects were read and evoked very interesting discussions.

"Twenty-five Years in Medical Journalism." By Dr. Edward C. Register, Charlotte, N. C., editor of *Charlotte Medical Journal.*

"The Influence of the Physician in Public Affairs." By Dr. Ira S. Wile, New York City, editor *Medical Review of Reviews.*

"Some Aspects of Medical Sociology." By Dr. James P. Warbasse, Brooklyn, N. Y., special editor *American Journal of Surgery.*

"Some Fundamental Considerations of the Problem of Narcotic Drug Addiction; the Medical Editor's Responsibility." By Dr. Ernest S. Bishop, New York City, Professor Clinical Medicine, N. Y. Polyclinic.

"The Relation of the Specialist to the General Practitioner." By Dr. Anthony Bassler, New York City, editor *American Journal of Gastro-Enterology.*

"The Medical Reserve Corps of the United States Army." By Dr. Harold Hays, New York City.

"The Doctor and Medical Legislation. The Medical Editor's Obligation." By Dr. C. F. Taylor, Philadelphia, Pa., editor *Medical World.*

"Medical Compensation Law." By Dr. Thomas Darlington, New York City, ex-Commissioner of Health, Member New York State Workingmen's Commission.

"The Problem of the Medical Expert." By Dr. J. J. A. O'Reilly, Brooklyn, N. Y., member New York Bar.

"The Possibility of a New Specialty." By Dr. B. F. Roller, B.S., New York.

"Our Trade Mark Laws in Relation to Foreign Made Drugs. A Problem of the Hour." By Dr. F. E. Stewart, Philadelphia, Pa., Chairman of Committee on Patents and Trade Marks, American Pharmaceutical Association.

Many of the members were accompanied by their ladies, for whom very enjoyable entertainments were provided in the form of a theatre party to the Hippodrome, Monday afternoon, October 18th, and an automobile ride through the upper section of New York the following afternoon. The annual banquet took place in the Green Room of the McAlpin Hotel, Tuesday evening, October 19th, and was a delightful affair. After an excellent dinner, the Toastmaster, Dr. H. Edwin Lewis, delivered his presidential address on "The Opportunities of the Hour for American Medical Journalism," and then introduced various speakers who responded in a happy vein to the toasts assigned to them. Among these were Dr. Henry O. Marcy, of Boston; Dr. W. C. Abbott, of Chicago, Ill.; Dr. Walter M. Brickner, of New York; Dr. J. J. O'Reilly, of Brooklyn, N. Y.; Dr. Charles F. Taylor, of Philadelphia, and Dr. Joseph MacDonald, Jr., of New York. Dr. E. C. Register, of the *Charlotte Medical Journal*, was elected president of the Association for the year 1915-1916.

NOTE.

Dr. William Seaman Bainbridge, of New York, one of our valued contributors, has recently returned from a sojourn in Europe, visiting the war zone and making a Red Cross, hospital and sanitary survey. He visited Holland, Germany, Switzerland, France, Belgium and England. He was at the several fronts, where he saw conditions at first hand, every courtesy being extended to him.

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Editorial Department

NEW YORK, NOVEMBER, 1915

VACCINES IN SURGICAL PRACTICE.

As the result of the European war much knowledge has been gained regarding the application of vaccine therapy—that remarkable though inaptly named branch of therapeutics given to the profession just ten years ago by Sir Almroth E. Wright. The occurrence of infected wounds, as well as, in a lesser degree, infectious diseases, is naturally increased enormously during war; and the opportunity to study the subject and to look into the by-paths that so frequently lead off the now well-beaten track has resulted in many interesting and profitable experiences. Many millions of doses of various bacterial suspensions have been prepared and administered in both the medical and surgical divisions of army practice.

The profession is just beginning to get some of the practical benefit of a number of the deductions made by those who have found time from their arduous duties to report their observations. Quite a crop of articles is now appearing in the medical literature of different European countries, and it is obvious that much attention has been paid to the subject considered here.

From a careful perusal of a dozen or more communications published in the last three or four months in the medical journals of Great Britain, Germany, France, Russia and Austria, it appears that many of the statements regarding the probabilities of vaccine therapy which were made by some of the enthusiasts six or eight years ago (and were received with the skepticism which, rightly or wrongly, is the customary attitude of the medical profession toward things new or novel), are well founded.

In surgical practice, especially, the use of bacterial therapy is advancing rapidly. In fact, the majority of the articles referred to above are concerned with various phases of vaccine therapy in war surgery. For instance, many hundreds of thousands of doses of a stock "mixed infection vaccine" made in various British laboratories, including that of Sir A. E. Wright at St. Mary's Hospital, London, have been used in the army hospitals in England and France as a means of preventing or reducing the dangers of the common pus infections in the innumerable wounds. The clinical results will be much more exactly tabulated later, but generally speaking, they have been very good.

One of the recent reports comes from Russia and forms part of a comprehensive consideration of the whole subject of vaccine therapy by Antonovsky (*Russky Vratch*, 1915, Nos. 14 and 15). In the

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latter part of his paper Antonovsky makes a pregnant remark anent the use of vaccines as prophylactors. He finds that small doses of mixed stock vaccines containing the usual pyogenic organisms may be given during the transportation of wounded soldiers with excellent results. He also emphasizes the value of similar inoculations prior to surgical operations both in civil and military practice.

In a recent general consideration of vaccine treatment Madden, of Cairo (*Lancet*, August 7, 1915, p. 271), recommends several forms of prophylactic bacterial inoculations. He advises the injection of pneumococcus vaccine before operations on the tongue, mouth and throat, and lays special stress upon the value of this measure prior to splenectomy. He likewise recommends the use of a stock colon vaccine "before severe appendicitis operations and also before prostatectomy"; and we presume that equal or even greater benefit is likely to accrue if this procedure is employed prior to appendicectomies that are not so "severe."

In fact, prophylactic bacterial inoculation is a rational and scientific pre-operative measure, as recourse to the Van Cott combination vaccine before abdominal and pelvic surgery will show. It may be well to add that injections of this character should preferably not be given within thirty-six hours previous to an operation.

Still another advance in vaccine therapy has developed in the war hospitals in northern France; and while it may have but little practical value to us in everyday practice, at least it shows the extending scope of this branch of therapeutics. The dreaded "gas gangrene" is now being treated with a polyvalent stock vaccine of the *B. perfringens*, and this method "offers a very promising outlook for the control of a disease which is extremely difficult to treat, and, incidentally, is another proof of the value of polyvalent stock vaccines over the much more difficult to obtain autogenous preparations."

The dosage of vaccines in surgical practice seems to be undergoing revision—downward. As prophylactors, generally speaking, the dose is large—the average doses recommended by clinicians and manufacturers remain the same; but in the treatment of infected wounds it seems best to give bacterial inoculations with caution, using the temperature curve to control the size and frequency of the injections. Captain Tidy of the British Red Cross Hospital at Netley makes the following remarks in this connection (*Lancet*, August 14, 1915, p. 327): "The endeavor is to give as large a dose as possible without producing a rise in temperature. The method of dosage described is based entirely on the treatment of wounds at Netley. Probably much larger initial doses and more rapid increases can be given without bad results in numerous cases, but if this is done there will be occasionally an unfortunate result with marked rise of temperature and severe symptoms, and when this happens the results are usually prolonged. The best improvement which can be expected from vaccines in the wounded cannot be held to counterbalance a few such instances. When this hospital was first opened, larger doses were given and the results were unsatisfactory. Therefore it is only justifiable to commence with very small doses."

The initial dosage recommended by Tidy is as follows: *Streptococcus*, not exceeding 2 millions; *B. coli*, 30 millions; *Staphylococcus aureus*, 30 millions. Subsequent injections are given at intervals of five days and when progress is satisfactory the successive doses are 50 per cent. larger. If there is a decided rise of temperature following an injection, the next dose should be half the previous amount. In acute septicemic conditions a stock *streptococcus* vaccine is given, the initial dose being 2 millions, and it may be repeated every two or three days.

With mixed vaccines Tidy does not advise reducing the amounts of the individual organisms, but combines them in the initial doses mentioned above, repeats injection in five days, and increases the dose of the bacterium considered to play the most important part in the infective process 50 per cent. at each administration, while the other organisms are increased by only 33 per cent. In cases receiving this treatment, an operation, however slight, is considered as taking the place of an injection, the next dose being given five days later. This does not apply to acute septicemic cases.

Surgeons have good reason to be grateful for the benefits conferred upon them by vaccine therapy, and the prophylactic use of bacterial vaccines in surgical practice demands still greater attention and wider application; it will shorten the post-operative confinement, reduce to a minimum the incidence and ill effects of infection, and its routine application will do much to enhance confidence in a procedure which is destined to come into still greater prominence not only in surgery, but in medicine as well.

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Department of Railway Surgery
OFFICIAL ORGAN
THE ASSOCIATION OF SURGEONS OF THE SOUTHERN RAILWAY.
ASSOCIATION OF SURGEONS OF THE PENNSYLVANIA LINES.
ASSOCIATION OF SURGEONS OF THE SEABOARD AIR LINE RAILWAY.

ANNUAL MEETING OF PENNSYLVANIA RAILWAY SURGEONS.

The Railway Surgeons' Association of the Pennsylvania Lines East of Pittsburgh met at the Hotel Martinique, New York City, October 18th, 19th and 20th.

The opening session began at 9 a. m. on the 18th with a meeting of the "Glad Hand" committee. There were twenty-five present on the hour, welcoming the surgeons. Each year this little bit of cheer becomes more popular and adds much to the spirit of goodfellowship.

When the business session began at 10.30 a. m. one hundred and fifty were present. There were registered during the three days over two hundred surgeons. There have been many excellent programs in the past, but none surpassed this one. All having a part in the program were present, except Dr. W. S. Bainbridge who was abroad. Dr. G. C. Boughton of Erie, Pa., who filled his place, read an excellent paper on the same subject (intestinal stasis). Space will not permit at this time the specific mention of each paper. They were all of a high order. Some were illustrated by lantern slides, radiographs and photographs; one, by the presence of patients. These papers will be published in the official organ.

A new feature was introduced at this meeting, namely, the devoting of each forenoon to clinics by prominent New York surgeons. The Post-Graduate Medical School and Hospital was most courteous in this respect, giving clinics each forenoon from 8.30 to 12.30, and providing a fine luncheon on the 19th from 12.30 to 2 p. m. The clinical feature proved very popular and many requests were made for its continuance.

The reception on Tuesday evening deserves special mention. The president's address by Dr. John B. Lowman of Johnstown, Pa., was masterful and timely. He dealt clearly and positively with the standardization of methods, of reports, of follow-up histories and of end results. Mr. E. B. Hunt, Superintendent of the Relief Department of the P. R.R., and Mr. R. H. Newburn, Superintendent of the Insurance Department, were present and delivered pertinent and practical addresses giving many interesting facts. Following these addresses there was a sort of old fashioned Methodist experience meeting which was much enjoyed.

The surgeons of the P. R.R. Lines West were the guests of the Lines East. Over fifty of them were present and participated in the discussions. They will again be the guests of the association next year when it meets at Philadelphia. They are mighty fine fellows and we greatly enjoy having them with us.

The following officers were elected for the ensuing year: President, Dr. J. B. Siggins, of Oil City, Pa.; first vice-president, Dr. W. B. Henderson, Phillipsburg, Pa.; second vice-president, Dr. C. J. Roberts, Berwin, Pa.; secretary, Dr. A. W. Colcord, Clairton, Pa.; treasurer, Dr. J. C. Egbert, Wayne, Pa.; member of executive committee, Dr. G. L. Romine, Lambertville, Pa.

Although the attendance was not as large as anticipated, there has been no meeting where there were more spirited discussions and more genuine and constant enthusiasm. All in all it was the best one ever held. S. M. F.

THE MALINGERER.*

By JOHN C. ROSE, Philadelphia, Pa.
Chief Claim Agent, Pennsylvania Railroad.

When almost a year ago Dr. Free asked me to come to this meeting and say something on a topic of interest to both the railway surgeon and the railway claim agent, there was running through my mind an episode which was then exciting the interest of all the railroads doing business in the State of New York, and I suggested that it might be well to discuss briefly, as it was my wish and intention, "The Malingerer," hence this number on your program.

The malingerer is a character of rather ancient antecedents, his activities running back to a time antedating the steam engine. He was then called a shirker of duty, and I think that all the modern definitions confine his activities to an association with obtaining wages without the compensating labor; and he seems to have been rather dormant until the advent of the electric street car which suddenly of-

* Read before eighth annual meeting of the Pennsylvania Railway Surgeons' Association, New York City, October 18, 19 and 20, 1915.

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fered a broad field for the exercise of his peculiar talents.

In this connection I would say, in passing, that most of the onslaughts upon the steam railroads by the malingerer and the professional claimant have been due to the development of their industry in the more agreeable atmosphere of the trolley railroad. It was so simple and easy and safe to fall from the running-board of an open car, or the steps of a closed car on a street railway, and sustain traumatic neurasthenia and all its accompaniments.

But there came a day when the street railway companies fought back and then it was that the most about "railroad spine" was heard as the chronic claimant transferred, in a measure, his patronage to the steam railroads.

I can now assure you and take great pleasure in saying that with the most enthusiastic and persistent aid of the railway surgeon the malingerer has virtually been put to his timely end. He is very, very seldom heard of nowadays, and his absence is so profound that when he does appear there occurs the excitement to which I a little while ago referred. That was a most pronounced instance of the resurrection of an evil spirit and I will tell you just a little about it.

A man of rather pleasing personal appearance and address would stumble over a carpet in the aisle of a passenger car, or get his feet tangled up with a hose on a station platform which had been used in cleaning up the place, and again would find an obstruction in his path as a passenger for hire, which would suggest actionable negligence on the part of the carrier.

In the seventeen known cases of his operations under varying names he presented about the same physical injuries, and I will read one report on a special examination that was made to determine how serious the case was:

"The man sustained a contusion of the left side just below the ribs. The blow was of such force as to injure internal organs—contusion and rupture of kidney, contusion of lung and of stomach, causing vomiting of blood and passage of blood in urine. Also severe pains in side, back and head. * * * If patient will remain perfectly quiet there is good chance of his recovery, so as to be able to sit up and go about some in ten days. * * * He fell forward in the aisle, striking on the metallic upper part and corner of his satchel, falling with full weight onto his left side."

In view of the fact that in all the seventeen reported cases, with one exception, the surgeon recorded these identical symptoms, it must be assumed that the man was an accomplished, artful deceiver and malingerer. He was not, of course, injured at all.

In the exception referred to, the surgeon made this comment at the end of his report which, however, carried a suggestion that the man had actually sustained some severe injury: "My impression is that he is a gambler, a liar and a dead-beat, and will make trouble if he can."

The surgeons who came in contact with this fellow throughout the State were men of the very highest standard in the profession, and the one from whose report I first gave an abstract has no superior as a surgeon, a physician or philosopher; and I want to take this occasion to convey to you gentlemen my unbounded confidence in the ability and integrity of, first, the surgeons of the Pennsylvania Railroad Company; next the railway surgeons of New York State, and, finally, and I would say of all quite equally, the physicians and surgeons engaged in the railroad industry throughout the land.

The fellow to whom I have alluded and probably made too much the subject of my remarks, it must also be remembered, fooled seventeen claim agents, and I am not going to admit that they lack just common intelligence. There was, however, in each instance a means which the claim agent might have employed to establish the bona fides of the claim, and it was a very simple method which finally disclosed the fraud.

The surgeon in his inherent honesty created by the very nature of his calling, is not looking for deception. If he were constantly alert to discover such practices or carry with him to the bed-side a doubt of the honesty of his patient, much of his value would be lost. He expects and provides for a certain amount of exaggeration, but not, of course, for absolute deception in his general practice.

But I desire to ask in closing with this part of my topic, whether this isolated case has not been of value to us, not that it casts a reflection upon common honesty or creates a doubt of the integrity of those with whom we come in contact in the performance of the duties of our respective profes-

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sions, but that it will enable us more readily to discover the malingerer.

The malingerer as we have him to-day, or rather the character most prominent in our labors whom we may transfer to that classification to fill the void, is the one who exaggerates his ills for the purpose of pecuniary profit. This is the one that calls for the closest application of your science and the activities of the claim agent.

I do not intend to take out of your already crowded day the time to treat this problem with the fullness that might be given it, and am going to leave that for you gentlemen to discuss among yourselves and with the claim agent on another occasion.

Malingering in this modified interpretation is a relative term, but applies in all its phases to the exaggeration of physical deficiencies for profit beyond a fair compensation.

And in this connection I want to say in closing that I feel it is the part of your organization to define such practices in the examination of subjects as will reveal the true condition, and this may lead up to the suggestion of a better form of accident report. I do not take much stock in formal accident reports, such, for instance, as is made by a surgeon examining an applicant for life insurance. I would rather have a statement in letter shape and let me give you just one such I received a little while ago. This is the report on a man who said he was thrown out of his berth in a Pullman car by the sudden lurching of a train while running around a curve. He claimed all the subjective symptoms known to medical science, but this is what the surgeon of the railroad company told me in a note:

"Stripped naked, I found a man of perfect form and attitude, and no bodily evidence of any physical defect. Examined heart, lungs, urine, head, spine, abdomen, arms, legs, private organs, teeth, gums, pharynx, nose, ears, knee and pupillary reflexes—all normal, no Babinski sign. No scalp tenderness to pressure or percussion. As far as physical findings go he could get life insurance with any company."

What better could I have had? I am going to stop now with just that suggestion, but I cannot leave you without giving expression to my sincere appreciation of the kindness of each one of you gentlemen whenever my duties have directed a call for help, and my very great pleasure at being with you all here to-day. I only wish that we could have more meetings of this kind for an exchange and interchange of opinions and thoughts on subjects of common interest, and I also want to leave with you the assurance that whatever there is in my power to give you shall have freely and fully.

THE PENNSYLVANIA RAILROAD AND ITS SURGEONS.*

By R. H. NEWBURN, Philadelphia, Pa.,
Superintendent of Insurance Department, Pennsylvania R.R.

I regret very much that the general manager is unable to be present this evening, as I am sure if he were here, he would have something to say of interest to the railway surgeons—something that would more clearly indicate the general interest of the company in your Association. However, I am safe in saying that the executive officials of the railroad are heartily interested in the welfare of your organization, for the railway surgeon is closely related to the company because it devolves on him to alleviate the suffering of those who sustain injury on the company's property.

Workmen's compensation laws have been adopted in 31 States and are the result of the movement having for its purpose the betterment of social and economic conditions of the workers of this country. Social justice demands compensation laws and earnest efforts for accident prevention. From an economic viewpoint, the loss of men impaired by disability and the loss of time and wages create a burden for society which must be taken care of; in the old days through charity, and in the new through compensation.

It is not my purpose to burden you with any statistical data, as the quotation of statistics is a tiresome process, but in order to appreciate the tremendous importance of your work, it might be interesting for you to know that last year there were 30,000 injuries to all classes of employees on the entire Pennsylvania Railroad system; this is the accident frequency in over 200,000 employees—10 per cent. of the total number of railroad employees in the United States.

Our payments on account of personal injuries amount to about $1,500,000 a year. Therefore, the personal injury problem is one of serious import-

* Read before eighth annual meeting of the Pennsylvania Railway Surgeons' Association, New York City, October 18, 19 and 20, 1915.

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ance not only to our company but to all of the railroads, and since it is the exclusive duty of the physician to care for those maimed or injured in the performance of their duties or while traveling on trains, it follows that the task of the railway surgeon is a most important one, and makes it imperative that after everything has been done to prevent injuries he must step in and see to it that every injured person receives proper treatment, in order that his period of disablement may be terminated as quickly as possible.

Mr. Long has asked me to convey to you his best wishes that this meeting will be most successful and instructive.

AMPUTATION OF THE THIGH.*

By B. M. TITTSWORTH, M.D., Jefferson City, Tenn.

On February 7, 1915, one cold, dreary Sunday evening, a poor little boy, eleven years of age, who, I venture to say, had not had a bath all winter, was playing along the Southern Railway's right-of-way. He and his brother decided that they would take a ride. A train had stopped to take water. When it started the boy caught hold of the tread-bars, which jerked him under the train. One wheel ran over his right leg and crushed it from about four inches above the ankle to within two or three inches of the knee-joint. I was immediately notified by the depot agent, and found the little patient at home near the place of the accident lying on a dirty old quilt, his leg wrapped in a dirty toe-sack. He was suffering so greatly and there was so much shock that I immediately gave him ¼ grain morphin sulphate and 1/150 grain atropin sulphate, hypodermatically, which had a good effect. In a little while he began to rally, and after examining his leg I decided at once that it would have to be amputated. Very little chloroform was required on account of the previous administration of morphin and atropin. The tissues and bones were mashed so badly that there was no earthly use of trying to save any part of it below the knee-joint. On account of the crushed condition of the parts there was very little loss of blood, and hemorrhage during operation was controlled by an elastic tourniquet applied a few inches above the site of injury, and by ligating or twisting all bleeding vessels—a most important act in preventing shock.

The most important feature of traumatic work is the saving of blood, and as many of our noted surgeons have told us, never try to do a major amputation in a case with a low blood-pressure. In my case there had been very little loss of blood and, of course, immediate operation was the best. I believe in operating as soon after the injury as the patient's condition will permit. So the question I had to decide was where should the amputation be made in order to leave him as good and serviceable a stump as possible—one which would not likely necessitate re-amputation for a conical stump; one that would not require too much sacrifice of tissue; one that would be painless and well covered with good flaps, and one on which an artificial limb could be worn easily and with comfort, the most important point to be considered in these cases.

Dr. William L. Estes of South Bethlehem, Pa., says: "It is best to amputate as low down as possible, and it is not best to amputate near the upper epiphyses in young people, for the growth of the shaft of the bones downward in children will nearly always produce a conical stump in a few years, especially in amputations of the upper part of the arm or thigh. Parents should be warned of this fact. It is much better to amputate as low down as possible, thus gaining the benefit of low mortality of the low regions, and re-amputate when necessary later on. Even knowledge of re-amputation should not induce the surgeon to make the amputation higher up."

I began to make my preparation for the amputation, such as sterilizing my instruments and getting my assistance. Antiseptics in these cases being a most important boon to the surgeon's success, I cleaned the leg thoroughly with green soap and water, followed this with bichloride solution, and then an application of tincture of iodine. I operated by lamp light and chose as the most favorable site for amputation the lower third of the thigh, in order to save as much tissue as possible and form a good stump for an artificial limb. The lower down toward the knee-joint the operation is performed, with the exception of amputation through the joint, the more rapid the healing process and the lower the mortality rate.

I could have done a knee-joint amputation, but personally do not like it, because I do not think it gives a useful stump. Knee-joint amputations have

* Read at twentieth annual meeting of Association of Surgeons of Southern Railway, Asheville, N. C., June 2-4, 1915.

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a low mortality, but according to Wyeth's text-book on surgery, the mortality is less in the lower third of the thigh, being about 17 per cent. as compared to about 32 per cent. at the joint, and, moreover, if the patient wants to wear an artificial limb he can do so with greater ease and comfort. Should I do a knee-joint amputation I would saw off all articulating surfaces. It is very important to have good flaps which can be brought together without tension. To secure these I made an incision through the skin and adipose tissue and dissected it back, making antero-posterior flaps. The anterior flaps were left longer than the posterior so that the cicatrix would be on the posterior part of the leg, which would prevent pressure upon it. I next dissected back the fascia. Then introducing a long knife in the angle of the flaps through the remaining tissues I cut through them diagonally from above downward, anteriorly and posteriorly, to the bone, divided the periosteum, and dissected it up, leaving enough of it as well as the other tissues to cover the end of the bone. I then applied the cloth retractor and sawed through the bone, beveled off the edges, ligated the arteries, resected the great sciatic nerve, cleaned the surface with bichloride solution, covered the end of the bone with periosteum, brought the fascia together over the muscles, united the skin flaps, put in catgut drainage between the flaps, and applied a dressing.

The boy got along apparently very well. I removed the dressing on the third day; the flaps appeared to be healing nicely and the drainage was good. On the fifth day I examined him again and found gangrene in the anterior flap for about one inch straight across or on line with the catgut drain. On the sixth day the gangrene was more pronounced. On the seventh day a line of demarcation was clearly established. I cut off the gangrenous portion of the flaps and reunited them with catgut sutures. The skin wound healed in a few days. As soon as I discovered that gangrene was likely to set in I applied gauze over the whole stump and ordered it to be kept wet with grain alcohol and witch-hazel, equal parts.

As to what caused this gangrenous condition I have never been able to satisfy myself. The flaps seemed to be perfectly healthy and showed no evidence of traumatism. It might have been due to handling of the parts by my assistant; very probably to the proximity of the site of operation to the knee-joint. Dr. Howard Lilienthal, of New York, states that amputation at the knee-joint has been found wanting, gangrene because of deficient blood supply to the flaps being not uncommon. He says further that it has been his habit for some years to make skin and muscle flaps rather than flaps of skin alone in order to retain the nutritional supply, and that being impossible about the knee is another point against selecting this place for amputation. Notwithstanding the gangrenous flaps my patient has a useful, painless stump on which he can wear an artificial limb with comfort and ease. The time for recovery from the operation was only forty days.

In reporting this case the points to which I most desire to call your attention are: The importance of immediate operation, the patient's condition permitting. The site of amputation in children. The cause of the gangrenous flaps. The importance of antiseptics. The loss of as little blood as possible, thereby preventing shock.

PRIMARY UNION NOT ALWAYS TO BE AIMED AT.*

By O. G. FALLS, M.D., Kings Mountain, N. C.

In asking your attention for a few minutes to the consideration of this very old subject, I do so with a full realization that it is one that can never be settled from any stereotyped viewpoint. So many factors enter into its consideration that different cases must of necessity be managed in entirely different ways. Primary union, or healing by first intention, is certainly to be desired, but in many cases we are confronted with so much traumatism and interference with circulation, as well as impaired vitality, that it is absolutely impossible to determine where to expect the line of demarcation, and consequently how much tissue to sacrifice.

The vitality and general condition of the patient must be very carefully noted, and his probable rallying capacity ascertained so far as possible. The condition of the heart and arteries should be given due consideration, as much depends upon the state of the circulation. Too much must not be expected of nephritic or jaundiced patients, as they do not react well, and their recovery even under the most favorable circumstances is often extremely slow.

* Read at twentieth annual meeting of Association of Surgeons of Southern Railway, Asheville, N. C., June 3-4, 1915.

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The age of the patient is often a very important factor, both as regards recovery and the vitality of the tissues of the extremities in particular. The sacrifice of a finger, a hand or a foot, or any part of either in the aged, for the sake of safety and prompt union, is probably more justifiable than the same sacrifice would be in the young, vigorous patient whose vital powers are strong and active, whose life work is just ahead, and whose consequent earning capacity enters materially into the problem. A piece of finger, if of any value at all, is worth more to a young man than to one who is old. Likewise an inch or two of either an arm or a leg may determine the practicability of an artificial limb and its consequent value to the patient, or the degree of liability of the railway.

As a rule, it is good surgery not to sacrifice any viable tissue. To obtain the ideal condition—healing by first intention—we must often remove tissues that would otherwise heal and be of more or less value; on the other hand, we should endeavor to preserve all tissues capable of future repair and usefulness; it is also imperative to avoid the risk of possible or probable infection and the consequent and frequent necessity of secondary operations, with all which that entails.

Now just where to draw the line and give each of these considerations its proper value, is the question that is ever before us and which calls for the exercise of every faculty that may assist us in selecting the proper mode of procedure. Under no circumstances should the patient's welfare be made a secondary consideration. His best interests are practically always in harmony with those of the railway, and they both merit our earnest efforts toward harmonizing them. Having once decided on our plan of action, it must be remembered both by the surgeon and by the nurse who is to care for the patient, that a conservative decision has been arrived at only after the most deliberate thought and that the very closest observation is demanded thereafter. The nurse is expected, of course, to interpret nature's calls for help, whether manifested by pain, the condition of the temperature, pulse, or respiration, or by swelling, odor, discharge, or in other ways, and report at once the least suspicious indications of danger. Everything should be kept in readiness to intervene at a moment's notice, and secondary procedures should be resorted to promptly with the same conservative care as at the outset. All this, unfortunately, cannot be as well attended to outside as in a hospital; therefore the surgeon is perhaps justified in attempting to conserve more tissue where the patient is fortunate enough to have hospital advantages than where he has not. Our strongest efforts should be directed towards securing the least possible damage to the patient, both present and ultimate, without subjecting him to more risk than may be consistent with such aims.

Surgical Gleanings

Skin Conditions Which Lead to Cancer.—Dr. Isadore Dyer (*New Orleans Med. and Surg. Jour.*, July, 1915) mentions among the kind of things on the skin which must be observed for cancer, all moles or warts which grow in size; all moles which change their color and grow dark brown or black; all small scaling spots which grow thicker and scab or bleed easily; all scaling warts, especially on the lips, the ears, the eyelids, the cheeks or the hands. He further states that: "Perhaps the most frequent excitant of all, so far as skin cancer is concerned, is dandruff. It falls from the scalp and lights on the ear, eyelids, nose, neck, lips and face, and if there is already a scaling spot, or a thickening, or a wart, a mole, or a gland ready to receive the dandruff scale, it sets this spot alive with activity and it goes on to form a skin cancer. Probably sixty per cent. of skin cancers are due to this cause, and many a cancer has been prevented and may be prevented by curing the dandruff or by preventing it."

Postoperative Vomiting.—Dr. C. W. Wahrer (*Med. Herald*, July, 1915) feels sure that postoperative nausea and distension are not so often the result of improper preparation, a week stomach or nervousness as they are apt to be due to rough manipulation of the intestines; trying to work through too small an incision; the crowding of too many gauze pads into the abdomen; insufficient protection of the intestines outside the wound; the tearing of adhesions with the fingers; the leaving of raw areas; the tying of mass sutures, imperfect hemostasis resulting in much sponging and in leaving blood in the abdominal cavity; the burying of large quantities of suture material in the body, tying ligatures too tight, and too tight strapping of the abdomen.

Goiter and Life Expectancy.—Dr. C. H. Mayo (*Lancet-Clinic*, June 12, 1915) states that from a surgical standpoint operations often aided by medical treatment cure exophthalmic goiters in about 70 per cent. of cases; that is, the patients feel well, are able to carry on the ordinary business affairs of life, and forget that they have been sick, although 20 per cent. still show slight wid-

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ening of the palpebral fissure, which, while not realized by the patient, is noticeable to the trained physician. About 16 per cent. of the remaining cases are notably improved, but not well, having some symptoms that remind them of the necessity of being careful. About 4 or 5 per cent. have been operated on when the degeneration of the essential organs of the body had become permanent and there was hope of but little improvement, but the progress of the disease has been checked. In younger individuals, about 5 per cent. with the same type of degeneration slowly make a partial recovery on account of their youth.

Autoplastic Replacement of the Flexor Tendons of the Fingers.—Dr. E. Delorme (*Bul. de l'Acad. de Med.*, Paris, August, 1915) describes a most ingenious procedure which he successfully practiced in a case of bullet wound of the palm of the hand, with considerable loss of substance. Several of the flexor tendons had been destroyed, and as the customary treatment proved unsuccessful Delorme formed a tongue-shaped flap from the tendons of the flexors of the forearm somewhat longer than the destroyed portions; this was separated above, but left in connection with the tendons below. The flap was then drawn under the annular ligament into the palm of the hand and sutured to the remaining ends of the flexor tendons of the fingers. In another case where the tendons of the middle and ring fingers in the palm were missing he transplanted in a similar manner two pieces taken from the flexors in the forearm, the one consisting solely of connective tissue, the other also of a thin layer of muscular tissue. Union was rapid and complete. The technic comprises: 1. An incision in the middle of the palm, or to the outer or inner side of the palmar arch. 2. In case no other autoplasty is feasible, search for the lower end of the flexor tendon, which can usually be found at its point of attachment between the middle of the palm and the phalanges. 3. An incision, 10 cm. or more in length, in the forearm, extending from the pisiform bone outward along the tendon to the unciform bone. 4. The parts are carefully exposed, the artery and ulnar nerve separated from the two layers of superficial flexor tendons over the entire extent of the incision. It is immaterial whether the flap is taken from the superficial or deep tendons to cover the defect; only those tendons are to be selected which do not transmit the movements of the uninjured fingers. 5. A channel is made with the fingers of forceps for the passage of the tendon flap under the annular ligament; the flap is then seized at its free end, drawn into the palm of the hand and united to the remaining ends of the destroyed tendons with silk sutures.

Injuries and Suppuration in Joints.—Professor Payr (*Münch. med. Wochensch.*, No. 37, 38, 39, 1915), in a comprehensive paper on this subject formulates the results of his experience in the following conclusions: 1. A distinction should be made between the benign, exudative, superficial suppuration of joints (empyema) and the severe capsular phlegmons (phlegmonous inflammation of all the soft structures of the joint, deep suppuration, panarthritis). In the latter necrosis and abscesses in and under the synovial membrane produce perforation of the capsule with resulting para-articular phlegmons and abscesses. The vast majority of capsular phlegmons are not primary but secondary to empyema, and to prevent this is the most important aim of treatment. The tendon sheaths and bursae situated near joints are favorite sites for pus to break through. Such abscesses can spread along the tendon sheaths and in the loose intermuscular connective tissue far from the suppurating joints. 2. Many joint infections originate from small previously unnoticed perforations of the capsule by fragments of bullets. A "foreign body abscess" develops which often does not infect the joint until the lapse of a number of days. This focus of infection may lead to repeated reinfection and severe capsular phlegmons even after adequate incision and drainage of the joint, and therefore is always to be removed. 3. Besides removal of the focus of infection it is necessary to evacuate the purulent exudate in the joint and to provide drainage for a certain time. In purulent synovitis mere incision (small) is sometimes sufficient, in severer cases drainage for a short time (glass tube). After evacuation of the pus the articular cavity should be filled with an antiseptic fluid, such as phenol-camphor, in order to prevent adhesions and swelling of the synovial folds, with resulting increase in pressure of the exudation and danger of suppuration in the deeper structures. In the case of hinge joints opening and drainage should be reserved for that part of the cavity which is injured and primarily infected since the rest may be walled off by the swelling of the synovial membrane and other structures. 4. If drainage is required in cases of severe infection it is advisable to establish it posteriorly where the discharge is most easily evacuated; if this does not suffice the joint should be opened up widely, even with temporary division of important ligaments and tendons. In chronic suppurations of enarthroidal joints late resection is frequently necessary.

Injuries of the Crucial Ligaments. — Dr. R. Morian (*Deut. Ztsch. f. Chirurg.*, Bd. 133, Hft. 5, 6) has observed five cases of this kind which added to those recorded in the literature gives a total of 36. The injury in his own cases was due to the action of the bodily weight or external violence causing the knee-joint when semi-flexed to be deflected at an angle with base outward and then to be suddenly rotated inward (in one case outward). Two of the patients came under treatment soon after the accident; the three others five, eight and twelve months after the injury. A positive diagnosis could be made only after Roentgen examination. Operation was required in three cases. In all of them slight impairment of mobility persisted and also pain in and about the knee-joint, especially during changes of weather. The prognosis should be cautious since in one instance a deforming arthritis later ensued.

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Original Articles

ACUTE EMPHYSEMATOUS GANGRENE.*

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When I was requested by our Secretary to present a paper of a practical nature upon some surgical subject, I selected that of acute emphysematous or fulminating gangrene, because of its, in my experience, relative frequency, extraordinary virulence, and the need of the immediate adoption of drastic measures in its treatment. I did not, however, as the title would indicate, confine myself exclusively to acute emphysematous gangrene following crushed injuries, for it is one and the same process whether it occurs after a compound fracture, a crushing injury, a punctured wound, a contusion, or a gunshot wound.

For practical purposes, it is not necessary that we review the literature concerning its bacteriology; suffice it to state that it is a microbic disease, caused by an infection with, usually, the bacillus aerogenes capsulatus or the bacillus of malignant edema, both obligate anaërobic organisms. These are widely distributed, occurring in the top layers of soil, dust, stagnant waters, and in the intestinal canal. No injury, however slight, is free from the danger of infection, but its most fertile field for development is in compound fractures, crushed injuries, and gunshot wounds.

Wounds that are most liable to become infected, are those into which dirty clothing or soil has been ground or driven. Filth is always conducive to its development. The season of the year is possibly a determining factor in its etiology. Of the eleven cases here presented, ten occurred during the hot summer months and one during the cold season. This one was directly traceable to an infection from the intestinal canal following a gunshot wound which riddled the cecum. Two were crushed injuries of the lower extremities, one a contused wound of the lower extremity, six gunshot wounds (five of the extremities and one of the abdomen), and two compound fractures of the tibia. In none of these cases was the blood supply in any way compromised, excepting in the crushed injuries in which amputation was done well above the site of trauma in apparently sound tissue within six hours after the receipt of the injury. The compound fractures were both treated aseptically by competent men at the time of the initial trauma. The first I did not see until two weeks after the accident, when he was brought to the hospital immediately upon the supervention of symptoms of sepsis. The second was first seen eighteen hours after receiving the injury, at which time there was a distinct gangrenous odor to the wound with subcutaneous crepitation surrounding it. In this series I wish to call to your attention the frequency with which emphysematous gangrene was associated with bullet and more especially shotgun wounds without interference with the blood supply.

The systemic symptoms are early those of a most intense toxemia—pulse rapid and poorly sustained; temperature always elevated, although it may be depressed; conjunctiva and skin showing early an icteroid hue; urine scanty and highly colored; leucocyte count high. The mind is at first clear, but soon a mental hebetude is manifested which changes into delirium as the disease progresses.

Locally the earliest symptom is the foul gangrenous odor and greenish black color of the surface of the wound, usually coincident with which is the development of a crepitation in the surrounding tissues, with edema and swelling. The rapidity with which the process develops is truly frightful. As examples take the two crushed injuries above mentioned. In the first, the ankle and lower quarter of the leg were badly mangled at 4 p. m. The limb was removed below the knee in apparently sound tissue at 9 p. m. The following morning

* Read before Association of Surgeons of the Southern Railway, Asheville, N. C., June 2-4, 1915.

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toxemic symptoms were marked, but there was no local evidence of infection; the afternoon following operation the sutures were removed, but still no evidence of wound involvement was present. Thirty hours following operation, at a contused area six inches above the stump crepitation developed, and within six hours more the process had spread to the trunk. The whole time from the receipt of the injury to the death of the patient was not over forty hours.

The second was a crushed injury just above the knee, and amputation was done at the upper third of the thigh. Within twelve hours from the time of receipt of the injury toxemic symptoms developed with crepitus over the end of the stump. The flaps were opened up thoroughly, and long incisions opening up the subcutaneous tissues and the intermuscular planes were made throughout the length of the stump. The symptoms gradually subsided and convalescence slowly progressed with sloughing of large masses of tissue.

Another case illustrating this rapidity of development was one of the compound fractures. The patient was in a motor car wreck at 6 p. m. and reached the hospital at 10 a. m. the next day. The wound at the middle of the tibia had a foul odor, the tissues presented a greenish discoloration, and there was some crepitation in its immediate vicinity. Toxemia was pronounced. The limb was at once amputated at the upper third of the thigh. Silkworm gut sutures were inserted but left untied, the wound being drained with large gauze pack loosely applied. The following morning all of the tissues of the stump were gangrenous, and within twenty-four hours more the process had extended to the axilla of the affected side, and before death it had involved the subcutaneous tissues of the whole of the abdomen and thorax anteriorly and laterally. These illustrations have been given as indicative of how formidable a condition it is with which one has to cope.

The prognosis is always grave. Most authorities estimate the mortality at from 55 to 60 per cent. In this series of eleven cases there were five deaths and six recoveries, a mortality of 45.5 per cent.

Treatment is both prophylactic and curative. Any method must recognize as its fundamental basis that one is dealing with a virulent, anaërobic organism; and in the prevention of the development of gaseous gangrene in any dirty or suspected wound it is essential that early thorough sterilization combined with free incisions for the relief of tension and the promotion of free drainage be adopted. One would think that thorough cleansing of the wound with tincture of iodine would prevent the grangrenous process, but in two of the most fulminating cases of this series it was used copiously and thoroughly. The best germicide for this type of organism is plenty of air.

At the first manifestation of its presence in a wound of an extremity, some authorities advise free incision. I have used this unsuccessfully, and unhesitatingly amputate as far away from the site of infection as possible. The stump is bathed freely in tincture of iodine; the flaps left open; silkworm gut sutures introduced but not tied. Should infection reappear in the stump, free incisions, regardless of length, opening up the subcutaneous tissues and intermuscular planes are resorted to.

In those cases where the lesion is so situated as to prevent radical removal, early, free incisions offer us our only hope. In both classes of cases the after-treatment consists in the constant application of moist antiseptic dressings, preferably a 20 per cent. solution of peroxide of hydrogen, and whatever systemic measures may be indicated to maintain the strength.

In the January issue of the *British Journal of Surgery* there appeared an article by C. B. Lawson and H. B. Whitehouse, reporting a method of treatment which they had found unusually successful at the front in the present European war. Judging from the results obtained, their method is worthy of consideration and is best described by an excerpt from their article.

"Half an hour before operation the patient receives a hypodermic injection of atropin sulphate 1/100 gr. and morphin tartrate ¼ gr. General anesthesia as a rule is employed; but if the patient is profoundly septic and the wound involves the lower extremity, spinal anesthesia is preferred. A point is then selected three or four fingers' breadth above the line of advancing gangrene, as shown by the dusky copper colored tint of the integument. An incision about ¼ inch in length is made through the skin and subcutaneous tissues as far as the fascial sheath of the muscles. A pair of sinus forceps is then introduced into the wound and the whole of the subcutaneous tissues opened up as widely as possible. The nozzle of an ordinary Higginson

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syringe is introduced into the incision and neutral peroxide at body temperature pumped into the subcutaneous spaces under pressure. The dissemination of oxygen is aided by kneading and massage. It is essential that the belt of oxygen be complete above the line of advancing gangrene, and therefore it is usually necessary to repeat the procedure at various points. This done, the gangrenous area is treated in a similar manner by puncture and infiltration. Finally the wound is thoroughly explored and cleansed. All foreign material, dead and contused tissue is removed and the cavity irrigated with normal salt solution (just to wash away debris and clot), and then freely with hydrogen peroxide. Drainage by rubber and gauze is established and the whole limb dressed with dry gauze and wool. The aim should be to allow free access of air coupled with efficient protection to the wounded tissue."

In the eleven cases treated by them in this way there were three deaths, none of which they attribute to the disease. There are two inherent dangers associated with this plan of treatment: air embolism and shock; but should further experience bear out their claims as regards the lowered mortality rate and the preservation of limbs, we will owe to them a debt of gratitude for placing within our grasp such an easy means of combating this formidable malady. Personally, I have never employed this method of treatment.

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There will seldom, if ever arise, the justification for the removal of both ovaries in a woman less than forty years of age. Better that she retain one ovary or a part of one ovary, and that a troublesome member, than to suffer a total loss of her ovarian secretions. In other words, it is better that she suffer some local discomfort than to become a hopeless neurotic. Where the uterus is deeply involved and it is advisable to remove the tubes, I am of the opinion that the best results will follow a complete hysterectomy. Less than this will fail to give complete relief and might endanger life from postoperative complications for lack of adequate drainage.—Dr. Palmer Findley (*Jour. Ia. St. Med. Soc.*)

SALPINGITIS.

By JOHN KING FREEMAN, A.B., M.D.,

Louisville, Ky.

The term salpingitis merely represents an inflammation of the Fallopian tube, which may be either unilateral or bilateral and is ordinarily classified as catarrhal, purulent, or interstitial. The last named variety is exceedingly uncommon and will not be considered in this paper. Associated with tubal inflammation there may be pyosalpinx, hydrosalpinx, hematosalpinx, tubo-ovarian abscess, ovarian abscess, parovarian abscess, etc.

The catarrhal variety of salpingitis is usually due to extension of inflammation from the uterus (endometritis), but even in this form the pathological changes may be quite serious; there may be considerable tortuosity of the tubes with general enlargement and more or less marked inflammatory infiltration.

In purulent salpingitis the tubal walls are extensively infiltrated, and tortuosity is markedly increased. The mucosa is filled with pus, the surface disintegrates, and the ciliated epithelium is destroyed. When the ciliated epithelium of the Fallopian tube is normal, the mucous membrane presents a vascular appearance, but in purulent salpingitis the mucosa is extensively infiltrated and the epithelium loses its cilia. Considerable exudate will oftentimes be found upon the serous surfaces, and adhesions to surrounding structures are common.

The differential diagnosis in the various forms of salpingitis is of considerable interest, especially those due to the most common causes, viz., infection by the streptococcus and gonococcus. In gonococcic salpingitis the onset is almost invariably slow, and is always preceded by infection of the external genitalia, particularly the urethra and vagina. There is commonly observed pain in one or both ovarian regions. While there may be little or no evidence of general peritonitis in gonorrheal salpingitis, the patient usually suffers more or less constant local pain; the temperature seldom reaches 102° F., the pulse may be rapid but the volume remains good. The attack may last from five to fifteen days, the patient oftentimes presenting the appearance of normal general health. Gonococci are usually demonstrable in the cervical, urethral or vulvo-vaginal secretions, and if the patient is married the history,

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as a rule, will show gonorrheal infection from the husband.

In streptococcic salpingitis the onset is more abrupt. It usually follows infection from abortion, childbirth, or topical applications to the interior of the uterus. Pain is more general and severe, especially in the lower abdomen, and there are usually present some of the symptoms of peritonitis. The patient suffers constantly, and the temperature is higher than in gonorrheal salpingitis, viz., from 101° to 105° F. The pulse may not be particularly feeble, but is generally quite rapid. The attack may last one month, three months, or three years.

Some difficulty may be encountered in the differential diagnosis between salpingitis and other intra-abdominal and pelvic lesions. In appendicitis, as a rule, there will be no history of any local disturbance, by which is meant urethral, vaginal or vulvar infection, tubo-ovarian disease, etc. In appendicitis an initial chill is usually absent; in acute tubo-ovarian disease a chill oftentimes precedes the fever. In appendicitis the onset is sudden with pain in the right iliac region but not radiating toward the thigh. In tubo-ovarian disease the onset is gradual with dull continuous pain radiating to the thigh. In appendicitis elevation of temperature when present is extremely variable in degree, which is also true in tubo-ovarian disease. In appendicitis muscular rigidity on the right side of the abdomen is marked. In tubo-ovarian disease there is little or no muscular rigidity unless there is a complicating peritonitis. Inflammatory exudate is usually noted about the appendix three to five days after onset of the symptoms, whereas in tubo-ovarian disease it is present at the first observation. Vaginal examination in appendicitis usually causes the patient no pain, but in tubo-ovarian disease it always does.

In nearly every instance salpingitis results from extension of an intra-uterine lesion. Anything which will cause inflammation of the uterine mucosa is likely to involve the Fallopian tube by extension of the infection along the mucous membrane which is continuous. Lacerations and ulcerations of the cervix and vagina may produce tubal infection, but gonorrhea and puerperal endometritis are the most common etiological factors. Uterine and cervical carcinoma and papillomata, syphilis and certain other diseases have also been mentioned as causes.

In catarrhal salpingitis there are usually also observed the customary symptoms of endometritis, such as abdominal pain and tenderness near the median line, backache, neuralgic pains in different portions of the body, etc. The temperature ranges from 99° to 101° F.; there is an increase in the leucorrhea, and menstruation is profuse. Bimanual examination reveals tenderness near the uterus, pain being increased when the uterus is moved. If the patient is kept quiet in the recumbent position, the symptoms sometimes soon subside. If a small quantity of menstrual blood is forced from the tube into the peritoneal cavity, that side of the abdomen becomes tympanitic, the temperature may reach 102° F., and the pulse increases in rapidity.

Purulent salpingitis is usually preceded by gonorrheal endometritis. The symptoms are usually more severe in the purulent form, but may be quite similar in character. In some cases purulent salpingitis may be as mild as the catarrhal form, as a small quantity of pus escaping into the peritoneal cavity may cause symptoms no more severe than a few drops of menstrual blood, especially if it be gonorrheal pus. Where there is a mixed infection the temperature is higher and the pulse more rapid. There is greater tympany and the resulting exudation may extend to the pelvic brim. The symptoms may persist days or weeks, the patient may be confined to bed for a month or more, and upon subsidence of the manifestations think she is entirely well. The symptoms may not recur for a week, a month, or it may be several years, unless the patient indulges in excessive exercise, takes cold during her menstrual period, or is too active in sexual relations. Recurrence of the attack may be attended by peritonitis, especially after abortion or parturition, with all the symptoms of septic infection. The temperature rapidly rises to 104° or 105° F., the pulse becomes thready and exceedingly rapid, respiration labored, the abdomen is tympanitic, and the patient complains of intense pain. Sometimes the pain is about as severe as when the entire cavity is filled with pus. Bimanual examination reveals the uterus enlarged and tender surrounded by infiltration. In some cases, however, no infiltration of the tissues occurs, and nothing except bilateral tympany will be noted.

The symptoms of tubo-ovarian disease may persist for a considerable period of time, and the pa-

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tient usually gives a history of having had a number of attacks. When pus is present the temperature will be 99° to 100°. Between the attacks the symptoms of endometritis are invariably present. There is pain more or less severe in character in one or both ovarian regions, pain about the bladder or rectum, leucorrhea, scanty, irregular or delayed menses, and the history of sterility.

As to treatment: Since salpingitis usually follows endometritis the first indication is prophylaxis. In acute endometritis following abortion or labor, thorough curettement with intra-uterine irrigation is recommended as appropriate treatment. The cervical canal should be kept patulous to insure adequate drainage. Frequent vaginal douches are sometimes beneficial.

In catarrhal salpingitis the patient should be kept at perfect rest in bed. Frequent vaginal douches of hot saline solution, saline laxatives, enemata of glycerine and water are the best methods to be employed. Salines should be given twice a day, or as often as necessary to keep the alvine evacuations soft. Morphin may be required to induce quietude. If septic symptoms appear, they are treated the same as sepsis due to other causes. When there is evidence of peritonitis, any manipulation which might interfere with perfect rest should be avoided.

In purulent salpingitis intra-uterine irrigations are indicated, but if bichloride of mercury solution is used, it should never be stronger than 1:3000 and must be immediately followed by physiological salt solution. The patient should be kept in bed so long as there is any elevation of the temperature. Vaginal douches and saline laxatives should be continued for weeks or even months, and sexual intercourse should be prohibited. The patient should lead a quiet life for some time to prevent a recurrence of the attack. Local treatment as a rule is of little importance. Dilatation of the cervix may be advisable to insure perfect drainage. Tampons of ichthyol and glycerine may be employed with benefit. Swabbing of the uterine mucosa with strong solutions, such as iodine and carbolic acid, has not proven especially advantageous in practice. Electricity has not accomplished as much as was hoped when first recommended in the treatment of salpingitis.

Intra-uterine manipulations should always be carefully conducted; otherwise a purely local condition may be converted into a general infection.

When symptoms become so severe and persistent that the patient is prevented from enjoying life, and the treatment outlined in the foregoing proves unsuccessful, the case had best be considered surgical and treated by prompt abdominal section.

For many of the data in the foregoing paper, especially with reference to the differential diagnosis, the writer is indebted to the works of Kelly and Findley, to whom it is desired full credit be accorded.

POTENTIAL FACTORS IN FRACTURE SURGERY OF THE SHAFTS OF LONG BONES.*

By E. P. SOLOMON, M.D., F.A.C.S.,
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In the search for surgical truth out of the mystic maze of all that is being said and done in latter day fracture surgery, one must indeed exercise a nice discretion.

Borderline cases remain borderline ones only as far as the individual view of the surgeon extends, apparently, and his hobby, be it conservative or ultra-conservative, radical or ultra-radical, finds its vindication in a near approach to a laid out routine.

Edward Martin decrees that all accessible fractures, including, surely, those of all long bones, in which the broken ends cannot be placed and retained in such position as to insure reasonable function and the absence of gross deformity should be promptly operated on—a sane view, perhaps, but one in which a wide latitude for the personal view enters, so wide, in fact, as to nullify its worth as a surgical dictum.

Blake holds that the trend of modern opinion dictates that fracture patients should not suffer from a too close adherence to inherited customs, but should benefit along with the rest from the advances of modern aseptic surgery.

Beckman sees in the treatment of fractures a content to follow the teachings of twenty-five years ago, with the obvious result that surgery of bones generally has not kept pace with advances made in other lines of the art.

Beck, in writing of compound fractures, says that the surgical busy-body with a brush in his

* Read at twentieth annual meeting of Association of Surgeons of Southern Railway, Asheville, N. C., June 2-4, 1915.

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hand and a basin of water and soap at his command, lathering and scrubbing until the parts appear clean to the layman and surgical tyro, has killed more patients than the dirt. He further states that plating compound fractures must sometimes be done to secure apposition, always with the consideration in mind of removing the plate as soon as its function of holding the ends has been obtained. He says a symposium of views of experienced foreign surgeons at Budapest recently confirms this opinion. Foreign bodies must be used as little as possible, however, in compound fractures.

Hessert, writing of fractures of the long bones, has put forth a truth that vitally affects us as railroad surgeons and one which we frequently have exploited in damage suits against our corporations. It is a common experience, he says, that a perfect functional result may be obtained in cases where there remains some overriding or angulation. The possession of this skiagraphic evidence, however, has resulted in unjust legal action, as deformity can be exaggerated by the x-rays and disability feigned by the patient. It behooves us as railroad surgeons, therefore, to obtain good cosmetic results, and this endeavor has its part in popularizing operative methods of treatment.

The views of Lane are too well known to be presented before this body.

Shands is recently quoted as saying that practically his whole experience with Lane plates has been in removing them from where they had been placed by other surgeons, and notably with poor results; while Carr thinks the operative treatment of any fracture should be relegated to the realm of last resort.

And so one could quote, *ad infinitum,* a variety of practices and preachments—a variety of dicta or more or less dogmatic assertions from the heavyweight surgical clinicians of to-day.

What then are the potential factors in the treatment of fractures of the long bones—methods we must choose as railroad surgeons for the purpose of getting the best results in these cases, the kind of cases we come most frequently in contact with, for we, as representatives of a group of the profession, care for perhaps a majority of adult fracture patients. Our aim first and always is the conservation of the life and limb of our patient and the measuring and preservation, in so far as our skill permits, of his future usefulness to himself and family, a question involving the intrinsic to him as well as to the corporate interests we represent—a by no means small part, however, overshadowed by the first. Our reputation for skill and surgical judgment, moreover, is at no place in the human body subjected to greater jeopardy in so far as results count.

Every fracture should receive its primary reduction with the patient anesthetized. It should be skiagraphed before and after reduction, certainly afterwards—usually two exposures from diametric points of view—or fluoroscoped.

The broad classification of treatment, non-operative and operative, should then be considered. Surely neither method is applicable to all cases. The surgeon who in practically every case can construe a sign or signs for operation is certain to be condemned, yet not more certain than he who uses non-operative methods always and is sure to find faults with his fixative apparatus in a large proportion of his bad cases. Every fracture that cannot be wellnigh perfectly reduced from an anatomical standpoint, so as to insure a minimum of deformity and loss of function, in which, in other words, a more perfect reduction by operative interference would insure, in the judgment of the surgeon, a better cosmetic and functional result, should, in my opinion, be operated on without delay, provided of course the patient is a good surgical risk, as nearly all of our railroad patients are. But when one compounds a simple fracture that is in mal-position, ununited or viciously united, he must be sure of his technic. The surgeon sure of his technic always must make it doubly sure. He must recognize the fact that here his hands are for the manipulation of his instruments and not for palpation, or other digital manipulation, of the open operation area. The punitive wail of the surgeon who, after infection has ensued in a clean fracture operation, pleads that he could not reduce without manual manipulation, is only an admission of faulty technic or of a short-sightedness in adequately supplying himself with a necessary quota from the many admirable instruments now on the market which render insertion of the fingers

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into such operative wounds absolutely unnecessary.

Gloves cannot be immunized against punctures in handling the heavy artillery lined up on the instrument table when complete for the direct attack on a fracture, and at no time is one sure of punishment by suppuration following a break in technic.

In a fracture of the clavicle the space from the humeral tuberosity to the base of the neck is shortened. For permanent dressing the shoulder should be carried upward, outward and backward, and while an assistant thus holds it the surgeon fixes it by his method of choice, preferably, I think, by a modified Sayre dressing. Three wide adhesive strips are utilized, the first, at or just above the middle of the humerus, pulling the shoulder backwards and encircling the thorax from behind forward; the second, overlapping the first on the posterior aspect of the arm, guided down over the olecranon, forearm and dorsum of the hand, placed toward the opposite shoulder, and strapped there, the plaster ending on the sound shoulder side posteriorly; the third, after the shoulder has again been made sure of elevation, encircling the thorax in a manner to reinforce the first two Over all a Velpeau or figure-of-eight towel is applied for comfort. In case of fracture of both clavicles, the recumbent treatment should, I think, be instituted for at least three weeks. Non-union sometimes occurs and here, as a rule, is easily operated on. Interposed fascia or subclavius muscle is the most frequent cause of it. The ends can usually be sutured with absorbable material. I have had at least one case in which a misplaced bony fragment, turned at a right angle to the long axis of the bone, had to be removed. In this case I used a Lane plate with a perfect result.

In fractures of the humerus the usual seat is at the middle or lower third, although it may occur higher. The common practice of strapping a V-shaped pad from the axilla to a point opposite the internal humeral condyle is a good one. Although anesthetization is said to be rarely necessary in most of these fractures, I find the contrary the best rule. Traction on the condyles and counter-traction by an assistant on the upper arm with manipulation of the fragments is usually effective. Coaptation splints, usually two, made of cedar veneer or paste board well padded and secured by starched bandages or adhesive plaster, suffice for the humeral region. The arm rests on the axillary pad, the hand, forearm and elbow are well bandaged, and the elbow bent to a right angle or a little more acute. A wide plaster swathe encircles the thorax fixing the arm, and the forearm is pinned in a sling. Some surgeons prefer plaster-of-Paris bandaging or splints. I sometimes use the former. Fractures can be comfortably secured thereby if the plaster is well applied and evenly so.

The humerus is a frequent seat for non-union to take place, for which operative interference is necessary except when contraindicated by constitutional reasons. I use the Lane plate which is not especially difficult of application. The important structure to watch is the musculospiral nerve, particularly in fractures of the middle and lower thirds. The nerve leaves the bone at about the junction of the middle and lower thirds. If previously uninjured, one must be careful not to contuse it at operation, as such abuse is followed by pain at the site, subsequent numbness along its distribution, anesthesia and paralysis according to the degree of injury; when enmeshed in callus or pressed on by metal plates secondary operation for its relief, which sometimes is not successful, is indicated. A permanent partial paralysis or troublesome neuritis sometimes remains. Exuberant callus formation occasionally causes paralysis in non-operative cases.

Fractures of the radius and ulna are likewise most frequent in the middle and lower thirds. They should be reduced by traction from below while an assistant counter-tracts the elbow and upper fragments. The bones should be pushed into place with the forearm supinated. When both bones are fractured simultaneously the parts should be dressed in plaster, or with plaster splints, from the axilla to the hand, and the forearm flexed to a right angle. An important point is to pad well over the brachial and radial arteries and watch the fingers as a guide to the circulation.

An internal right-angle splint from the middle of the humerus down the middle of the forearm on the radial aspect immobilizes the elbow which

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is necessary in fractures of either bone in the middle third or higher.

Non-union, as elsewhere, is most frequently caused by interposition of soft parts and should be corrected by operation when definitely determined. Absorbable suture material and wire are frequently of service in operations on the bones of the forearm, but personally I prefer short Lane plates, the approach for which offers no great obstacles. Greenstick fractures of these bones in the presence of deformity should, as the popular teaching dictates, be made into complete ones and reduced accordingly, since, if only bent back into place, most of the deforming angulation usually reappears.

Just a word as to the potential factor in the treatment of a Colles: Don't be afraid to use great force. Deformities resulting after this fracture, as a rule, are caused by employment of too little force in reduction. Force the lower fragment into position by first liberating it from the upper by hyperextension, traction and direct pressure with the thumbs on the dorsum of the wrist, and then by a mighty but steady pull in the long axis of the forearm push the fragments into apposition, making sure of anatomical alignment. In most of these cases it takes great force to complete a perfect reduction, after which any approved method of immobilization will secure it there.

Fracture of the shaft of the femur is usually oblique, and it has been my experience that in railroad cases this is especially true. It may be subtrochanteric, in the middle third, or supracondyloid. It is well to remember that even in closed fractures damage to the thigh vessels is a possibility, requiring special treatment and sometimes, unfortunately, necessitating amputation, although it has been my good fortune never to encounter such a case. In this fracture it is of great importance that surgeons who transport cases a distance for the application of the permanent dressing should carefully apply an emergency dressing putting the parts well at rest. For permanent fixation a modified Buck's extension, with coaptation splints surrounding the thigh, makes a good dressing. The amount of weight for extension can to some extent be determined by the amount of pull necessary to reduce by traction while an assistant counter-tracts and fixes the pelvis. Usually between 15 and 20 pounds of weight beyond the pulley will answer the requirements. In my own hands a modified Hodgen's splint has been of great service, except in lower third fractures where the use of plaster-of-Paris from the trunk to the foot is better. When properly applied with plenty of assistants available, this is my method of choice for fractures low down. The Hodgen's splint is perhaps the most comfortable of all dressings, but a method open to much criticism by many surgeons. J. C. DaCosta, in the 1914 edition of his "Modern Surgery," perhaps the best one volume general book on surgery extant, says: "The Hodgen's splint as applied by Dr. George S. Brown, of Birmingham, Ala., is one of the most satisfactory and comfortable appliances that can be worn, and excellent results are obtained by its use. In case of transverse fracture immobilization without extension may be all that is required." Personally I prefer extension, however, obtained by sewing muslin strips to the adhesive plaster on the lateral surfaces of the limb, drawing them through loops fastened to the lower end of the splint below the plantar surface of the foot, and tying or clamping them together after the necessary extension is applied by force.

In any method one must be sure of the prevention of outward bowing and backward sagging as well as of rotation of the leg. No result should be considered satisfactory where a shortening occurs of a greater amount than unfractured femoral deviations verify.

I think the Lane bone-plating operation the method par excellence when operative interference is indicated. Elaborate electric driven armamentaria for the procuring and placing of animal bone plates and screws are now in use and may come into greater favor shortly, but certainly at the present time I prefer to bone-plate this class of fractures. Just below the external trochanter a fracture may preferably be operated on by nailing, a method devised by Trendelenburg and first used in this country in fractures of the neck of the femur by Willy Meyer in 1892. In cases of fracture of the femur high up with a short upper fragment flexed and abducted, where counterextension fails and frequently results in bad limbs, as well as in some supra-condyloid

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fractures, where tenotomies are necessary to obtain good anatomical results, we should seriously consider primary operative reduction. It is here, if anywhere, that fracture patients, as Blake holds, are entitled to the advances of modern aseptic surgery.

Fracture of the shafts of the tibia and fibula in the great majority of cases can be satisfactorily treated by the routine use of plaster casts. Temporary dressings are frequently of great importance, as here is the most frequent place for great swelling, with bleb formations and hematomata, threatening the life of the limb. A nice judgment is required for intervention by free incisions in the long axis of the limb through the skin and fascia for the relief of marked edema and hematoma, with pressure on vessels and subsequent gangrene threatening to ensue.

In that class of cases of oblique fracture of the tibia low down where the quadriceps pulls the upper fragment forward and the gastrocnemius holds the lower one backward and upward, I prefer open operation to a tenotomy with a speculative result. The maintenance of perfect anatomical alignment and the prevention of bone rotation, so important in this class of fractures and so often difficult of accomplishment without operation, are the desiderata which influence this conclusion.

TREATMENT OF TETANUS.*

By L. S. OPPENHEIMER, M.D., Tampa, Fla.

During the past twelve months a vast amount of literature on tetanus has appeared in the European and American medical journals.

Some of the authors corroborate, in substance, a report made by the writer to this association in 1910. Observations made since that time have strongly emphasized several important declarations in that report, and have demonstrated the undoubted value of certain methods of treatment, which are materially decreasing the mortality of this disease.

Many of you remember the Yandell law, to which your attention was then called and which should be borne in mind in the treatment and prognosis of every case.

Dr. D. W. Yandell, Surgeon General of the Confederate Army, stated after the Civil War, that a case of tetanus developing within four days from the time of the infection was almost invariably fatal, in spite of all treatment; while those cases with an incubation stage of over eleven days nearly always recovered. The differences in these incubation periods are supposedly indicative of the degree of virulence of the toxin—the shorter the incubation stage the more virulent the poison, and vice-versa.

The toxin is demonstrable in the blood several days before clinical symptoms manifest themselves —four days in the sheep. It is self-limited in the blood even in fatal cases. The same rule evidently holds good for the nervous system in recovered cases, the neuro-toxin exhausting itself.

The greatest, hence the principal, factor in producing death is the rapid and terrible exhaustion due to the muscular contractions, and not the toxemia nor the neuro-toxins. This means, that if we can control the convulsions and maintain the patient's strength, the toxins will gradually lose their force and we can save many cases heretofore doomed to positive death.

The present treatment of tetanus is practically limited to:

Prophylaxis,	Antitetanic serum,
Magnesium sulphate,	Chloretone,
Phenol,	Chloral hydrate.

Prophylaxis. The prophylactic treatment is confined to opening and disinfecting the wound and the injection of antitoxin. The local treatment, in brief, is to cleanse with hydrogen peroxide, open the wound to get to the bottom, apply tincture of iodine and alcohol 50 per cent. of each, carbolic acid, or strong solution of potassium permanganate.

The prophylactic dose of the serum is 1,500 to 3,000 units injected subcutaneously. If the trauma has occurred in a filthy place, as in a stable, dirty back yard, street or filthy house, or has been inflicted by objects probably infected with tetanus bacilli, inject it intravenously; its effects are more rapid and reliable.

In the entrenched camps around Paris, nearly every wounded man received antitetanic serum; yet 1.1 per cent. developed tetanus, of whom 70 per cent. died. The incubation stage averaged six to eight days.

Magnesium sulphate. The intraspinal injection of a 25 per cent. solution of magnesium sulphate.

* Read at fourteenth annual meeting of Association of Seaboard Air Line Railway Surgeons, Wrightsville Beach, N. C., August 16-18, 1915.

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which, for a while, promised encouraging results, is so fraught with danger to the respiratory and cardiac centers that it is not to be recommended.

Carbolic acid (Bacelli's method). The injection of 1 per cent. carbolic solution has been generally abandoned.

Antitetanic serum. This has some definite antitoxic or neutralizing power, but has not proven to be reliable after clinical symptoms of tetanus appear. Some recoveries have followed its heroic administration. In many of these the treatment was supplemented by sedatives and anticonvulsives. Comparatively few recoveries could be credited to the serum alone, except in the long incubation cases, and in these, as stated before, the prognosis is usually more or less favorable.

As soon as the first symptoms appear 3,000 units are injected intraspinally, and 3,000 to 6,000, according to the rules already mentioned, intravenously. Six to twelve hours later 3,000 units are administered subcutaneously. The intraspinal injection may be repeated in twenty-four hours. One-half to one ounce of fluid is first withdrawn from the spinal canal before injecting the serum.

Chloretone. This is giving some excellent results. Because of its being sparingly soluble in water it is given preferably per enema in doses of 10 to 60 grains in an ounce of warm olive oil, and repeated in six to twelve hours, according to the age, stage of the disease, and severity of the symptoms. By the mouth it is given in some peptic elixir or whiskey, in milk, or albumen-lemon water. If the convulsions are not promptly controlled, say within an hour or two, the dose is repeated—remembering that it is slower to act by the bowel than by the stomach. It is practically non-toxic in these doses, and should be pushed heroically and rapidly, and faithfully continued as long as necessary.

Chloral hydrate has given the writer and his associates most encouraging results—10 to 15 grains, well diluted, by the mouth, to children between five and ten years of age every three to six hours according to the symptoms; 30 to 90 grains to older children and adults, according to age and symptoms. Repeat every four to six hours the first day or two, then diminish doses and lengthen intervals gradually. If the convulsions are not checked in one or two hours repeat half the dose. If the patient cannot swallow give the drug in 50 per cent. larger doses by low enema in 4 ounces of warm normal saline solution, and repeat every four to six hours, as indicated.

Don't be afraid of depressing the heart by overdoses. "The drug becomes toxic only when the nerve cells have practically resumed their normal degree of functional activity." So long as convulsions are present the drug is neutralized in overcoming them. Give it for effect! Forget all your former teachings about the doses, toxicity, cardiac depression. In tetanus give it for effect!

Before each bowel injection, whether for medicinal or nutrient enemata, always wash out the bowel gently with a warm normal saline solution. Deliberate gentleness in all manipulations and conduct is a supreme rule in tetanus.

Remember the Yandell law. The earlier the signs the more potent and fatal the poison; hence the greater the demand for prompt, heroic treatment regardless of the severity of the symptoms. Delay or timidity is not to be tolerated.

The cause of death in nearly every case is the exhaustion due to the convulsions; and the prognosis depends on our ability to control these spasms from their incipiency, nourish the patient, maintain his strength, keep bowel and bladder functions in shape.

Sulphate of soda daily, or less often; large quantities of drinking water by the mouth, or saline by the bowel if unable to swallow without difficulty; nutrient enemata every four hours, if needed; careful sterile catheterization in retention cases; mouth toilet; daily tepid baths; absolute quiet and gentleness—these are merely mentioned here as reminders for the nurse.

SECOND REPORT ON A NEW METHOD FOR FACILITATING INTESTINAL ANASTOMOSIS.*

By M. BENMOSCHE, M.D., Detroit, Mich.

My data at the time that the preliminary report was written were very meagre, but I have been able to amplify them considerably by animal experiments and by a good deal of research with several varieties of gelatine and the various processes for preparing the bolus.

It appears that "Cox's Powdered Gelatine" is thus far the best quality to use, and 50 per cent. in normal saline gives just the right consistency. Obviously great care must be exercised in rendering the bolus sterile. With this in view, 1 per cent.

* Read before Maimonides Medical Society, October 12, 1915.

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trikresol is added to the gelatine mixture while in solution, and the mixture is sterilized in an Arnold sterilizer for half an hour on three consecutive days, then run into sterilized molds about twelve inches long and of a diameter of one inch. I have found sterilized paper tubes of the above size very convenient for this purpose. After "setting" the bolus is released from its mold under rigid asepsis, rolled in an aseptic powder, and kept in a sterilized glass chamber for use. I have kept a bolus for three months at ordinary room temperature. It gradually becomes very hard, therefore easier to handle, but its solubility remains unimpaired. I have failed to procure bacterial growth on a bolus inoculated with staphylococcus aureus.

The method is especially adapted for end-to-end anastomosis, although for lateral anastomosis, with a properly shaped mold such as is suggested in Fig. 2, it ought to serve equally well.

There are two methods for facilitating end-to-end anastomosis that hold place of first importance,

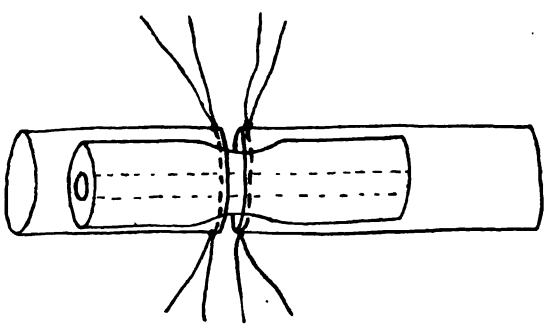


Fig. 1. Mold suggested for end-to-end anastomosis.

namely, Murphy's button and Laplace's forceps. There have been a number of others that for obvious reasons have not been used to any extent. Of these we have the decalcified bone-tube of Neuber advocated by him in 1888. Then came the raw potato peel, which in effect possesses some of the virtues of the gelatine bolus, but the number of obvious disadvantages at once precludes its general use.

When we come to lateral anastomosis we have a number of excellent methods to choose from, such as Senn's decalcified bone plates and the McGraw elastic ligature, but each of these in turn has certain disadvantages peculiar to the particular method. The McGraw ligature is certainly not applicable where we desire to have a free intestinal canal in a very short time, say a matter of three hours. It is excellent because of the rapidity with which it can be applied, and in cases where we can wait for its constricting action to give us the desired results. Decalcified bone tubes or plates and Murphy's metallic button undoubtedly act as foreign bodies in the canal. We have seen a number of disastrous results from each of these methods, but the dangers attending their use have for some reason or other not prevented their general employment. To quote from Sajou's reviews of 1888, "the methods of Neuber and Madelung are regarded of especial value in uniting the resected ends of the intestine. In the former a piece of decalcified bone tube, 2 cm. in diameter and bulging in the center, with a deep groove in the middle, is employed. The ease with which the sutures are taken over a firm substance, protection of the wound from contact with the intestinal contents, and the free passage afforded for the contents of the intestines are the advantages claimed for this method. The decalcified bone tubes disappear in the intestine. The method of Madelung consists in the use of disks

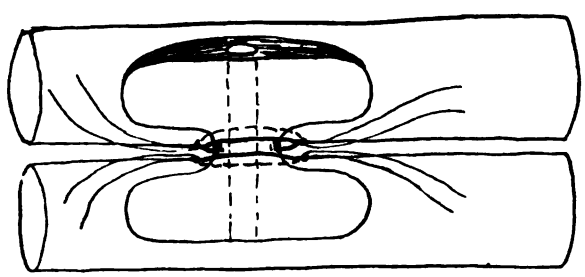


Fig. 2. Mold suggested for lateral anastomosis.

made from the costal cartilages of a young calf." Thus it is easy to see the evolution of the decalcified bone plates of Senn and even Murphy's metallic button.

The method of using the "Gelatine Bolus" consists in running an anchoring suture around the aperture of each gut, for either end-to-end or lateral anastomosis, as shown in accompanying figures. Each gut is then slid over the bolus and the cut surfaces approximated. The anchoring suture is first tied tightly around the bolus and the four free ends of each suture tied to the free ends of the opposite suture. This completes approximation. A few more anchoring sutures are applied, and the final steps accomplished by two rows of Lembert sutures. The bolus will dissolve within three or four hours, leaving a united bowel free to heal without the interference of any mechanical foreign object. The gela-

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tine undergoing solution aids hemostasis, so that the tendency to hemorrhagic oozing is greatly minimized. Owing to the rapidity of the method tendency to shock is likewise minimized, particularly in view of the fact that cases requiring resection are already suffering from more or less shock. It renders clamping of the gut in order to facilitate handling unnecessary, for although careful clamping of the intestine can be done without any obvious damage, still it is unquestionable that pressure, as applied by a clamp for any length of time, must in some degree or other devitalize the tissues and directly interfere with the healing process.

310 Fine Arts Building.

SIGNIFICANCE OF VESICAL SYMPTOMS IN THE DIAGNOSIS OF RENAL CONDITIONS.*

By WILLIAM F. BRAASCH, M.D., Mayo Clinic, Rochester, Minn.

The underlying lesion in the kidney may have little or no localizing symptoms, while the secondary vesical condition may give rise to all the subjective symptoms. The renal conditions which are most frequently the cause of vesical symptoms are: (1) Tuberculosis, (2) pyelonephritis and (3) lithiasis.

1. *Renal Tuberculosis.* Although the fact that vesical symptoms usually predominate with renal tuberculosis has been reiterated by many observers, it is unfortunately true that it fails to obtain general recognition. Of the 203 cases of renal tuberculosis which I reported several years ago, 90 per cent. of the patients had vesical symptoms extending over a period of six months, and more than 50 per cent. more than a year. The remainder had vesical symptoms the cause of which remained unrecognized in some instances as long as ten years. Early recognition of the disease not alone improves the prognosis, but, of equal importance, it may prevent the unfortunate deep-seated infection of the bladder which is so difficult to eradicate. As a rule, the vesical symptoms with renal tuberculosis are more severe in the male than in the female patient.

2. *Pyelonephritis.* Diffuse infection of the renal parenchyma and pelvis with organisms other than tubercle bacilli and coming under the term of pyelonephritis usually causes a variable degree of infection of the bladder. The resulting cystitis is usually less severe than that which occurs with tuberculosis, and consequently the vesical symptoms are less marked. Occasionally, however, the cystitis with a pyelitis may be marked and when accompanied by areas of ulceration is suggestive of tuberculosis. When the infection is unilateral and the urine from the affected side is grossly purulent, the two conditions may closely resemble each other. If guinea pig inoculation is impracticable, error in diagnosis may easily occur. On the other hand, general infection of the kidney is frequently present with pyonephrosis and very purulent urine, but with little or no infection of the bladder or vesical symptoms.

Localizing symptoms referred to the kidney occur even less frequently with pyelonephritis than with renal tuberculosis, the irritability of the bladder alone calling attention to the presence of the pyelonephritis. Pyelonephritis as the cause of cystitis in the adult male was found in 109 of the 121 cases recently reported from the Mayo Clinic. In the adult female, the proportion of the cases of cystitis as the result of chronic renal infection, although much lower than in the male, is nevertheless very great. No case of so-called cystitis should be regarded as such without a careful exclusion of possible renal infection. The treatment of such cystitis by means of internal medication supposed to have a urinary antiseptic or antispasmodic action or, still worse, by operations on the pelvic organs, is to be strongly condemned unless a careful investigation has first been made to rule out the presence of an etiologic renal infection.

The simplest way to establish the existence of renal infection obviously is by ascertaining the presence of pus in the urine catheterized from the respective kidneys. The amount of pus in the urine thus obtained varies considerably, depending on the degree of infection at the time of examination. To exclude the renal infection definitely a bacteriologic examination of the catheterized urine would be necessary, and only if negative, might be regarded as absolute evidence. A pyelogram in doubtful cases may also be of considerable value. It has been demonstrated that infection in the renal pelvis and ureter is followed by dilatation of their walls as the evident result of cicatricial change. Demon-

*Abstract of a paper read before the joint session of the American Gynecological Society and American Association of Genito-Urinary Surgeons, May, 1915.

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stration of such dilatation in the outline of the renal pelvis or ureter would be conclusive evidence of previous active infection, even though the urine failed to show any evidence of active infection on microscopic examination. Renal functional tests and, phenolsulphonephthalein in particular, owing to its practicability, may be of corroboratory and differential value. It has long been known that diminution in renal function follows extensive renal infection. The degree of tissue destruction may frequently be ascertained by the degree of diminution of dye return. As Geraghty has shown, a pyelonephritis is characterized by considerable decrease in phenolsulphonephthalein return, while there is but little with pyelitis. Occasionally, however, pyelonephritis may be present without any appreciable difference in functional output.

3. *Lithiasis.* At the time of colic resulting from urinary obstruction by stone in the kidney or ureter, irritability of the bladder and frequency of urination are often predominant symptoms and may be of importance in the differential diagnosis; in fact, the absence of vesical irritability coincident with pain would be a factor in exclusion in the interpretation of a doubtful renal or ureteral shadow. When the stone is lodged in the vesical portion of the ureter, and the pain is localized largely in the bladder and adjacent area, vesical irritation may be persistent. When the pain with low ureteral stone is localized in the suprapubic or low inguinal area it is usually the result of a localized periureteritis. The impacted stone causes ulceration in the ureteral mucosa and the resultant inflammatory reaction is the origin of constant pain. The radiation of pain with renal lithiasis may be largely referred to the area of the bladder. This is particularly true in children. Recently a little girl of ten came under my observation with symptoms only of severe sudden pain lasting a few minutes, localized entirely in the suprapubic area. In keeping with our policy to radiograph the entire urinary tract in cases of doubtful abdominal pain, her radiogram showed a definite stone in the right kidney which was removed, with her recovery.

Cystitis. Although a very large proportion of cases of cystitis are the result of renal infection, it should not be stated that cystitis may not exist as a primary and sole focus of infection in the urinary tract. I have observed a number of cases of cystitis where careful examination of the urine catheterized from the kidneys, including bacteriological tests, failed to show any evidence of renal infection.

Neurosis of the Bladder. Such a condition of the bladder usually occurs when other evidence of neurosis is also present and appears to be part of a symptom-complex. It is this unfortunate group of patients who in their effort to obtain relief for their vesical symptoms are frequently subjected to repeated needless operations on the adjacent pelvic organs.

Bladder Symptoms as the Result of an Extra-Vesical Cause. In the differential diagnosis of the various causes of irritation of the bladder, the influence of adjacent extra-vesical conditions should be considered. Although in a small proportion of cases these may be the direct source of vesical symptoms, their importance has been greatly exaggerated. This is particularly true of conditions in the female pelvis which are so often erroneously regarded as the cause of vesical symptoms.

When vesical symptoms are due to extra-vesical conditions, they are the result of (1) pressure of a tumor; (2) mechanical interference; (3) malignant involvement, or (4) direct extension of an adjacent inflammatory process.

1. *Pressure of a Tumor.* The pressure on the bladder of large tumors of extra-vesical organs may be the cause of vesical irritation. It is surprising, however, how small a proportion of uterine tumors, even though large, will give rise to irritation. Removal of a large uterus without tumor involvement in order to relieve vesical symptoms is seldom advisable.

2. *Mechanical Interference.* Mechanical obstruction to the urinary flow as the result of uterine displacement in an otherwise normal uterus is not common. Large tumors of the uterus and adnexa are only occasionally so situated as to cause mechanical obstruction to the urinary drainage. Cystocele, even though extensive, only in exceptional instances is the cause of actual urinary retention.

3. *Malignant Involvement.* Involvement of the bladder by malignant conditions in the pelvic organs occurs less frequently than one might expect. The number of cases of cancer of the uterus with actual vesical involvement which may be visible on cystoscopic examination is surprisingly small. Cancer of the rectum involves the bladder more frequently than pelvic cancer.

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4. *Inflammatory Extension.* Vesical symptoms may result when the bladder becomes involved from an inflammatory condition in the female pelvis. Cystoscopic examination then shows either a punctate erosion or a bullous edema in that portion of the vesical mucosa adjacent to the inflammatory process.

In conclusion, therefore, I would urge a careful consideration of all the possible causes of vesical symptoms, including renal infections, ascending infection, local infections, ulceration and neurosis, and that plastic operations on the pelvic organs be resorted to in only exceptional instances.

A UNIQUE CASE AND OPERATION.

By FRANK E. FOX, M.D., Fulton, N. Y.

A young woman, eighteen years old, was referred to me about three months ago with no recto-vaginal septum for its outer two and one-half inches. This condition had existed since her birth, being due to an accident during delivery. The obstetrician mistaking a breach for a face presentation inserted a finger in the rectum, thinking it was the mouth, and in using traction tore the delicate partition which separates the rectum from the vagina through and through, including sphincter ani, levator ani muscles and fascia. No attempt was made at the time of delivery to repair the laceration or have it repaired. She also had a partial prolapse of the uterus; the cervix lay among the folds of the rectum, and every time the bowels moved it became covered with fecal matter. The uterus was large and boggy, the cervix raw and irritated; otherwise she felt normal. As she was rather a handsome young lady and engaged to be married, she wanted the above condition remedied if possible.

She was ordered to the hospital for the usual preparatory treatment. I first did a ventral fixation of the uterus, choosing this method of supporting the organ as the round ligaments were stretched and thin, being no larger than ordinary twine string in nearly their whole length. I also removed a long chronically inflamed appendix and the right ovary, which was cystic, closing the abdomen in the usual manner. Then I started the seemingly difficult part of the operation by denuding a strip on each side at the point of junction of the rectal and vaginal mucous membrane, where considerable scar tissue existed in places, which was removed. Denudation was done back to the remaining partition between the vagina and rectum which was about two and one-half inches. The edge of this remaining septum was also denuded. Then by means of twenty-day No. 2 chromic catgut on a small curved needle I succeeded in bringing the lateral walls of this cavity together at the point of the denuded areas, reinforcing on the vaginal surface, as I went along, with No. 1 twenty-day chromic catgut, proceeding in this way until the closure was completed. Fascia and remnants of sphincter ani were brought together as well as could be, which left a good sized vagina and rectum, and with a good thick wall between them. The bowels were not allowed to move for seven days.

The parts healed perfectly, except a small fistulous opening in one place; this was operated on and closed two weeks after the original operation, after which she was left with an apparently normal looking vagina and rectum, over which she has perfect control.

She has since married and missed one menstrual period.

CONSIDERATION OF A BASAL FRACTURE OF THE SKULL.*

By J. H. TAYLOR, M.D., Columbia, S. C.

On October 26, 1914, an engineer was looking towards the rear of his train, leaning out of the cab window. While the train was moving about six miles an hour, the back and left side of his head struck the beam supporting an overhead bridge. He was rendered unconscious, and in this condition was seen by Dr. B. of Spartanburg, S. C. The doctor noted some bleeding from the nose and mouth, but could find no evidences of a broken skull. After about two hours the man regained consciousness.

The nose bleed continued for several hours after the injury. No discharge of blood or fluid from either ear was observed. The following day he came to Columbia on a stretcher and was placed in the hospital.

We found a large muscular man about 35 years of age, who was complaining of severe headache and pain in the back of neck when he moved his head in any way.

* Read at twentieth annual meeting of Association of Surgeons of Southern Railway, Asheville, N. C., June 2-4, 1915.

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An ecchymosis of the left upper eyelid was present and the left side of his forehead was swollen and abraded. The left side of his head was also swollen and very tender to the touch.

There was a very slight motor paralysis of the left side of the face, showing only when tested for. Careful palpation could detect no depression suggestive of a fracture, and other than possibly the facial paralysis, there were no motor pressure symptoms. Articulation was perfect and the mental activities appeared normal.

With him, I must add, came a letter from the doctor, saying the case worried him a great deal in view of the symptoms being out of all proportion to the evident injury.

Now the first question that naturally occurs to us is: has the man a fractured skull, and if so, where?

Let us emphasize here as strongly as we can the grave and urgent importance of an eye ground examination in head injuries, for from this we get the most valuable information as to the presence or absence of serious injury. But rarely does this fail us, and thereby hangs a tale of pathos and tragedy.

What we see in an interior of the eye examination is an optic neuritis, with congestion, hemorrhage and exudation. Usually this manifests itself by what we term choked disk and indicates undue intracranial pressure. When this is present it must be relieved by a decompression operation of some sort, else we have resulting optic atrophy and loss of vision.

Now to return to our engineer. We, indeed, had his eyes examined by an oculist within an hour after his arrival, but aside from a slight swelling of the nerve head, there were no pathological changes. This seemed to relieve us of the necessity for a decompression for the present.

But what importance shall we attach to the hemorrhage under left upper lid. I have no doubt whatever that had this been noted carefully at the time, it would have been seen to deepen gradually during the first few hours after the injury. Another peculiar feature of this particular hemorrhage was the absence of any evidence of a blow about the eye, nor was there any edema or swelling. Where did this blood come from? It oozed through a fracture of the upper wall of the orbital fossa, which extended back towards the midline, occasioning the bleeding from the nose. Blood escaping from the nose or mouth is only of diagnostic value if we can exclude local injury, and if it persists for a number of hours as occurred in our engineer.

In the majority of fractures of the base certain cranial nerves are more frequently injured than others, owing to the fact that the majority of the fractures pass through the petrous portion of the temporal bone and from here extend forward; hence one should always examine a patient for evidences of paralysis of the seventh nerve, of the sixth (internal strabismus and diplopia), of the third (external strabismus and ptosis), and of the fourth (diplopia).

At the same time we must not forget that injury to one or all of these nerves can occur without fracture of the base, so that a diagnosis of fracture should not be made from nerve paralysis alone, but by careful consideration of other signs, as subcutaneous hemorrhage, evidence of nerve and vessel injury, etc.

The facial paralysis in our case we interpret as due to the extension of the fracture through the petrous portion of the temporal bone, involving the seventh nerve.

The man had his head elevated, an ice bag applied, the room darkened, and absolute quiet instituted; furthermore, bromides were given for their cerebral quieting effect, and his nasal cavities were cleansed at frequent intervals with an antiseptic.

We then settled down to a course of watchful waiting, expecting meningitis and praying against it. The eye grounds were examined daily for reasons we have heretofore made obvious.

After a week's time he was so much improved that he was allowed up in a chair, and soon left the hospital for his home.

From this date on he reported for general and eye examinations at increasingly longer intervals, none being more than a week. He complained at first of headache, insomnia and nervousness, and later became quite irritable, any noise annoying him especially. This of course was attributable to the severe brain injury.

Now, on December 15th, he was examined by Dr. Whaley, the oculist, who reported the eye grounds and vision as practically normal. On December 21st, however, his vision was found to be 20/200 in the left eye, and the right optic nerve head was much swollen. A decompression operation was advised at once to relieve the intracranial

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pressure, and to save, if possible, the eyesight. Through an intermuscular incision a subtemporal button of bone was removed on the left side, resulting in the right eye clearing up promptly, while the left gradually grew worse, until in a week's time bare light perception persisted. Since that date he has become totally blind in the left eye.

Now, what happened that the true pathological condition should have been so long cloaked? The man had a hemorrhage too small to give rise at first to sufficient intracranial pressure to manifest itself in more than a mild optic neuritis, but situated so as to produce a post-bulbar pressure optic neuritis gradually extending outward with subsequent atrophy and loss of vision. Of course, had we decompressed this man at the time of the injury, he would to-day have normal vision in all probability. On the other hand, there was no way of discovering the true state of affairs until the atrophy appeared in the nerve head—too late then to render relief.

This case illustrates graphically, it seems to me, our total helplessness in certain types of cranial injuries, and holds within itself the strongest kind of plea for both a most careful initial study of these cases and a subsequent painstaking supervision. A patient rendered unconscious by a head injury is in a very grave condition and we can never tell what the outcome will be. Decompression, if done at all, is in the great majority of instances done too late. This especially holds true in cases of hemorrhage when we look for the classic slow pulse and high pressure symptoms which are absent in a large proportion of cases. If the skull is opened only when these symptoms are evident, many cases which could be relieved are neglected, with consequent loss of life or, at least, sight.

When the slow pulse and high pressure are present they are indications of the reaction to high cerebral pressure, and there is no reliable sign which will indicate whether the vital centers will be overpowered in five minutes or will continue to react and keep the blood pressure above the cerebral, resulting in recovery. Even so, if the high pressure continues sufficiently long, we have the inevitable optic neuritis, atrophy and consequent blindness.

Finally, in a word, give your patient every chance in a doubtful case by recourse to a surgical procedure devoid of danger in skilful hands, even as we deal with the doubtful type of tumor in the woman's breast.

ESSENTIALS IN THE TREATMENT OF EYE INJURIES.*

By T. W. DAVIS, M. D., Winston-Salem, N. C.

Eye injuries are broadly classified as perforating and non-perforating. The perforating again are divided into two classes according as the injury is made by a large sharp instrument leaving no part of itself in the eye, or by a small sharp instrument which is almost certainly left there.

Of non-perforating injuries or contusions, any one or more of the following lesions may be present:

Ecchymoses or emphysema of the lids.

Fractures of the orbit.

Ecchymoses or lacerations of the conjunctiva.

Abrasion, contusion, or rupture of the cornea.

Effusion of blood in the aqueous chamber or vitreous.

Iridodialysis, or lacerations of the iris.

Astigmatism, subluxation or luxation of the lens, or cataract.

Rupture of the sclera, choroid and retina, or detachment of the retina.

Compression, contusion, or rupture of the optic nerve.

The treatment of an eye injury resolves itself into two main considerations: (1) The prevention of infection. (2) The repair of injured structures with the least resulting scar tissue and disfigurement. Important is the prevention of infection, since inflammation in the eye actually means the destruction of normal tissue with consequent impairment of function.

To have a fair show at the prevention of infection the injured eye should have the proper care as early as possible, certainly in the first six hours. Indifference and neglect at this stage on the part of the patient are common, and especially is this true in slight injuries of the cornea, the oculist being consulted only after discomfort and pain come on as a result of infection. It should be borne in mind that the merest abrasion of the corneal surface is sufficient for the entrance of infection, and if this becomes well established, the procedure then, instead of being the approved, modern, and safe practice of prevention, becomes a forced attempt to save the eye from the harmful effects of inflammation. On the one hand, we have the patient coming

* Read at twentieth annual meeting of Association of Surgeons of Southern Railway, Asheville, N. C., June 2-4, 1915.

early, the foreign substance, if any, removed, the wound made clean, the eye put at rest, the patient made comfortable, with practically no loss of time from work or cost to the employer, and no anxiety as to the future usefulness of the eye. On the other hand, we have the patient consulting the oculist late, with an infected wound and inflammation already established. Then follow weeks of treatment with discomfort and loss of time for the patient, probably considerable cost to his employer or others, and anxiety to the physician as to the ultimate results concerning the eye.

Often among laboring men a foreign body in the cornea is left to "work itself out," or worse still, a fellow workman adds injury to injury and doubles the risk of infection by trying to remove the foreign body with some unclean instrument, *e. g.*, a toothpick. Such practice is not in accord with right living under the present conditions of enlightenment, and as far as the Southern Railway is concerned I hope that it will be discouraged and entirely eliminated. Foremen and superintendents could see to it that eye injuries among the men under them had immediate attention by the company oculist, and this will be to the great advantage of the employee, and will mean to the company a saving in pay for loss of time, physician's and hospital fees, and possible damages.

A reasonable attitude and co-operation on part of the patient and employee as a part of proper relation between employee and employer are nothing more than right and just. The following case recently under my observation is an illustration of what may result from indifference on the part of an employee:

A fireman came to me March 31, 1915, with a history of having gotten a foreign body in the right eye in December, 1914, over three months previously. Two or three days after the injury he consulted an oculist (not the company's) at a town a hundred miles distant. It seems that he was treated irregularly and with a lack of thoroughness, for at the time of his first visit to me there was an active septic corneal ulcer, with an old corneal scar and fixed posterior synechia. The inflammation subsided and the ulcer healed under treatment, but the corneal opacity of one and one-half to two millimeters near the center persists and will always decidedly impair vision. Therefore he has a permanently bad result. That this condition was avoidable I am sure. According to observation, without exception, a non-perforating corneal wound given proper attention, that is, all foreign substance removed, the wound made clean early after injury, and the eye put at rest for two days, will remain free from infection; therefore there will be no corneal scar and no possibility of untoward results. This is prophylaxis, which is the essence of good treatment of all disease. The most essential feature of prophylaxis as regards traumatism of the eye lies in the early care given the wound and the eye into which infection may gain entrance; and as this is true of a non-perforating wound, so it is true of a perforating one.

The principles in general underlying the proper treatment of an eye injury are old and need no elaboration; such are asepsis, necessary surgical procedures, rest for eye and body, etc. But the frequency with which we are called upon to treat traumatic infections of the eye and the harmful resulting effects lead me to say that there is still an inexcusable neglect in applying these principles at the proper time, and this we should try to remedy. Of course the greater percentage of eye injuries occur among the manual laboring class, and of those who can ill afford the loss or impairment of vision there are none more so than railroad employees. If this neglect is owing to the attitude of the injured person (as it often is) and the reason for it is ignorance, then education is the remedy. Either he or some one in contact with him should know and see that the right thing is done. If the neglect is solely from indifference on the part of the injured person, then he alone should bear the loss without complaint.

The treatment in detail of each perforating wound of the eye is more or less a law unto itself, and the chief essential lies in the good judgment and skillful action of the oculist; and there is a broad range for display of this judgment from the time one is called upon to determine whether there is a foreign body in the eye to the ultimate decision that it is or is not necessary to do enucleation in order to prevent a sympathetic involvement of the other eye. The aids at our command for determining the presence and location of the foreign body are greater now than ever before, but there are cases in which all means will fail, and the course of procedure will depend upon the judgment of the oculist.

There are three conditions in which the indica-

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tions are clear for the removal of the eye: (1) Where a foreign body cannot be removed early, especially if in the ciliary region, or if this cannot be done without serious damage to the structures. Still there are reasonable exceptions to this rule. I recall a case in which a good sized piece of steel had been in the eye for several months. It was plainly seen lying on, or in, the retina in a harmless way, and there had been no inflammation or impairment of vision of consequence. In such a case one would counsel "watchful waiting," the patient being made aware of the possible future trouble. The location of the foreign body and the presence or absence of infection are the determining factors. (2) The second condition indicating removal (without exception) is a "septic" panophthalmitis, meaning by "septic" that inflammation with pus formation in which there is absorption of septic material, differing from certain general inflammations in which no pus is present, or if present, is slight in the anterior chamber, and may be relieved by absorption or drainage. (3) This condition is one where there is extensive perforation of the coats of the eyeball. Here again the removal of the eye is conditional, and the good judgment and skill of the oculist count for much. This class of injury is of especial interest for one reason. With an extensive perforation extending from the cornea through the ciliary region, well back in the sclera, causing prolapse of the iris and uvea and luxation of the lens, the debatable question in one's mind, barring sepsis, is: whether *the irritation* in the ciliary region from the dislocated lens, and from scar tissue following the usual repair of the wound, might not endanger the other eye from sympathetic involvement. There is no doubt good reason in contemplating the possibility of sympathetic trouble whenever the ciliary region is involved, but I am convinced from observation that there is no great risk from scar tissue alone, or a luxated lens, acting as an irritant. Without question it is very essential to save an eyeball if possible, even if the amount of vision retained is slight, and it is equally true that this is worth much to the defendant in case liability for damages arises. An eyeless socket is conclusive evidence, and overrides and overrules all other issues in the minds of the average jury, while with an eyeball intact there must be a question as to the amount of vision retained.

I have noticed in cases of extensive rupture of the coats with prolapse of the uvea, that although the lens is uninjured, the patient says he can see nothing. This loss of vision is evidently due to a disturbance of refraction from the abnormal position of the lens and possibly a loss of vitreous. I know that it prevents one's getting a view of the fundus with the ophthalmoscope. In this latter condition (that of dislocation of the lens) a wonderful improvement may take place as time goes on, which must be by reason of the effect of the repair and the regaining in volume of the vitreous. Marked improvement in vision in two recent cases of mine as recovery from injury took place, the freedom from any indication of sympathetic involvement that I feared from irritation in the ciliary region, and the marked degree to which the vitreous reforms, have led me to be very conservative as regards enucleation in cases of extensive tears of the coats and apparently extensive destruction of tissue.

Rest for injured and uninjured eye and body is essential for good results in the treatment of an ocular trauma; therefore the patient's attitude toward and interest in his recovery are important. In this respect a surprising indifference is sometimes shown. In hospital the patient's conduct, of course, can be governed. When the injury or infection is not severe, we often allow him to remain at home. Thorough care in this instance, however, is very important. Again we sometimes allow the patient to leave the hospital in a convalescent state, and have a recurrence of inflammation as result of some imprudent act or failure to carry out directions. Generally speaking, the attitude of the employee of a corporation, when injured, is to place the entire burden of his getting well upon the company, and in this state of mind he is apt to forget or neglect the personal effort that is rightfully expected of him.

Forced rest of the eye itself is best obtained by the use of atropin and the bandage, and a dark room to discourage the use of the uninjured eye. Rest in bed with restricted diet (after a thorough purge), to insure a quiet uniform general circulation, is also quite essential.

Antiseptics are essential if there is a break in the superficial tissues, and I believe there is no agent so efficient either for prevention or treatment of a surface infection as the bichloride of mercury in a 1 to 4000 solution. Infection with pus in the anterior chamber sometimes responds well to drain-

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age with irrigation and filling the chamber with a strong solution of argyrol. All detail in treatment, however, is a matter of individual practice, and is based on underlying principles, old and well established. The end always desired is, first, to prevent infection (to check it if already established) and to repair injured structures with the least possible resulting scar tissue and disfigurement.

My apology for presenting this brief paper is to emphasize two features looking to securing best results, and which are especially apropos in connection with railroad practice. They are:

(1) The very essential need of early, if not immediate, attention to the injury by the oculist.

(2) Extreme conservatism when the extensiveness of the injury suggests immediate enucleation.

DISEASES OF THE NOSE, THROAT AND EAR FROM THE PRACTITIONER'S VIEWPOINT.

By JAMES JOSEPH KING, A.B., M.D., New York.

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(*Continued from November Number.*)

BENIGN TUMORS OF NASO-PHARYNX.

In the preceding article, naso-pharyngeal polypi were described. The next in frequency of the benign neoplasms are the *fibromata*. These are found chiefly in male adolescents, between the ages of ten and twenty-five. A few cases are encountered in females. Occurring at this age they evidently have something to do with the development of the bones of the cranium, but why they should show the specific sex incidence is a matter of conjecture. It may, however, be of some significance that when the tumor occurs in the female it has been noted before and after the age limit mentioned above (ten to twenty-five years) (Wright and Smith).

The growth springs from the fibrous tissue and the periosteum over the basilar process of the occipital and the sphenoid bones. It is made up of dense fibrous connective tissue in which there are areas of spindle and round cells, with occasionally a giant cell. As a rule, the blood-vessels are small and thoroughly embedded in the fibrous tissue, so that their walls do not collapse readily when cut and therefore they bleed freely. However, they are sometimes large and numerous. It is often very difficult to differentiate a fibroma from a sarcoma by the histological examination. A distorted adenoid in childhood may resemble a fibroma in its clinical appearance. Cysts sometimes develop in the adenoid tissue of the pharynx, especially from the median recess or the so-called pharyngeal bursa.

A few cases of *papilloma* of the naso-pharynx have been described, but they are so rare that they need not be considered here.

Teratoma of the pharynx is frequently observed. They are unusually congested and consist of tissue springing from two or three embryonal cells. Their most frequent site is the epipharynx. They have been called "hairy pharyngeal polypi," as they are usually pedunculated cysts filled with hair and other histological structures. They may be attached to any part of the pharynx.

Other benign tumors of the pharynx are *cystomata, lymphadenomata,* and *myxomata.*

Symptoms.—There is a similarity of symptoms in benign and malignant tumors of the naso-pharynx, so that it is often impossible to differentiate them by any method except microscopical examination. This is especially true in the early stages. Obstructed respiration and thickened speech are symptoms common to all of them. Nosebleed is not only a symptom of true naso-pharyngeal tumors—whether benign or malignant—in their early stages, but also of adenoids and other conditions. Severe pain is often a symptom in the late stages of fibromata and in the early stages of malignant growths. As time progresses, the increasing pain, the cachexia, and enlarged cervical glands present in the latter will settle the diagnosis. The microscopical and post-rhinoscopic examinations and palpation, however, should enable one to make a diagnosis before the cachexia and unmistakable signs of malignancy develop. For the ten years following the advent of puberty in the male, the chances of the growth being a fibroma are large, if the existence of lymphoid hypertrophy does not account for the condition (Wright and Smith).

The appearance of a fibroma is that of a smooth tumor or one divided into several lobules. The surface is reddened and may be ulcerated. To the examining finger it gives a hard, resistant sensation. This is also true of the fibro-sarcoma, which is most common between the ages of thirty-five and fifty-five, although not infrequently found between the ages of fifteen and thirty-five. Even a microscop-

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ical examination too often leaves one in doubt about the diagnosis. If after two years of observation and doubt—even after the microscope has failed to clear up the diagnosis—the outlines and limitations of the tumor are still clearly defined and it has not infiltrated the soft parts, one is justified in the conclusion that the growth is of a benign character (Wright and Smith). This is especially true if it



Fig. 88. Soft fibroma of the epipharynx, springing from the base of the sphenoid and sending finger-like prolongations into the nasal chambers. ("Diseases of the Nose, Throat and Ear," Ballenger.)

occurs in a male between the ages of fifteen and twenty-five years.

Course of fibromata. These grow rapidly, soon filling up the naso-pharynx, nasal cavities, and accessory sinuses, and may cause marked exophthalmos by pressure at the back part of the orbit. As the tumor enlarges there is a development of the frog-face with protrusion of the eyeballs, separation of the superior maxillary bones and widening of the face. These symptoms of continued growth and advancing involvement of the neighboring structures, which may include ocular symptoms, limitation of the field of vision and atrophy of the optic nerve, may, after the age of nineteen or twenty, reach a stage of rest in which the patient is no worse, and regression may subsequently set in or even entire absorption ensue (Wright and Smith).

If the patient's health and strength can be maintained, the fibroma may gradually disappear by a process of fibrosis. This, however, may not take place until the age of thirty is reached, and the symptoms are so distressing that some relief must be sought before this absorption occurs. From the clinical picture of fibromata and their close histological resemblance to some of the malignant growths, it seems to the author that there is no good reason why they should be classed as benign tumors.

Treatment.—The radical removal of fibromata of the naso-pharynx is attended with frightful and alarming hemorrhage. The ramifications have probably extended into the sphenoid, the orbital and even the cranial cavities. The question of operation is therefore a serious one. They tend to recur after operation until the patient is past twenty-five years. A small naso-pharyngeal fibroma, with its base not too diffused, offers no extraordinary risk for operation. On the other hand, the large ones with extended ramifications offer most serious difficulties.

Some writers have suggested the injection of monochloracetic acid into the tumor in order to hold its growth in check until it would undergo regression by fibrosis. Harmon Smith has devised a special post-nasal syringe for the injection of this acid. He advises its injection directly into the mass at intervals of one to two weeks, beginning with three minims and increasing one minim each time until ten have been reached. He claims that such treatment may, if persisted in, culminate in the disappearance of the growth. His syringe is so constructed that the needle is covered by a flexible steel protector until it is carried into the naso-pharynx and against the tumor, when by digital pressure on the thumb-piece at the distal extremity of the syringe the needle is exposed and held in place by a rachet on the side of the instrument until it has been introduced into the mass and the injection completed. The slough from the injection of monochloracetic acid seems to be held within the

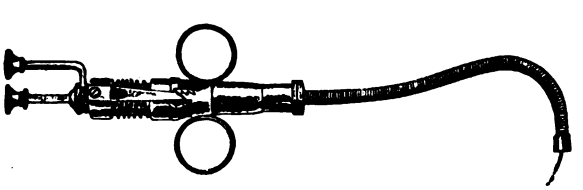


Fig. 89. Harmon Smith's postnasal monochloracetic acid injection syringe. ("Diseases of the Nose and Throat," Wright and Smith.)

fibrous capsule of the tumor, and he claims that no Eustachian disturbance or other unfavorable results have been noted from its employment.

Other methods of treatment, as electrolysis and the galvano-cautery, have been recommended. A considerable number of favorable cases have been reported in which the external carotids have been ligated. As portions of fibromata extend into re-

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gions where they receive nourishment from other sources, the ligation of the carotids may be very disappointing. Some have been removed by seizing them with a strong pair of forceps, as adenoid forceps, and quickly and forcibly pulling the tumor from its attachment. Such measures will most likely be followed by dangerous hemorrhage.

When operative measures fail or there is recurrence after partial removal of the tumor, injections of monochloracetic acid should immediately be instituted (Wright and Smith).

MALIGNANT TUMORS OF THE NASO-PHARYNX.

The malignant growths of the naso-pharynx are *sarcoma, carcinoma,* and *epithelioma.* Epithelioma is so rare that its consideration here is unnecessary. Sarcoma is seen in children as well as in adults. Carcinoma rarely occurs under the age of forty. Sarcoma occurs relatively with greater frequency in males than females, and the reverse is true of carcinoma. Secondary involvement of the naso-pharynx also takes place from the extension of malignant growths in the nose, orbit, antrum, tongue, and especially in the tonsils.

Symptoms.—In their early stages, the only symptoms of malignant growths in the naso-pharynx may be those which are produced by a rapidly increasing neoplasm in this region. These are obstruction to nasal respiration and a nasal twang to the voice. Sarcomata often begin to ulcerate and to slough in their early stages. Later, pain of a lancinating character is complained of and there is frequent hemorrhage, which may be either in the form of epistaxis or bloody expectoration. There is a fetid muco-purulent secretion. Early enlargement of cervical glands occurs. Later, there is the cachexia of malignancy. Usually by the time a diagnosis is made the disease has progressed so far that little can be done for the patient except to ameliorate the suffering. In appearance a malignant growth of the naso-pharynx is dark purplish, in contradistinction to the bright red of the fibromata as seen by the post-nasal mirror.

Prognosis.—The prognosis of malignant disease of the naso-pharynx is always grave. Sarcomata have been successfully operated upon. However, they usually recur and terminate fatally. Carcinomata are always fatal, and run a very rapid course, death generally ensuing in from three to twelve months, either from sepsis or from an erosion of the bloodvessels of the neck with fatal hemorrhage.

Treatment.—If the diagnosis of sarcoma is made early and its operative removal seems to offer a fair chance of prolonging life, it should be undertaken. Surgery for the eradication of malignant disease in this region belongs to the most heroic class of major surgical work. Such operations are fully described in the larger books on general surgery, to which the interested reader is referred. When metastasis has taken place, with involvement of the structures of the neck, even modern treatment as yet holds out no hope for the patients. At the present time all that can be done is to make them comfortable by the use of anodynes and allow the disease to run its course.

40 East 41st St.

BOOK NOTICE.

Modern Biologic Therapeusis. A Concise and Practical Treatise on Biologic Products for the Use of Practitioners in the Modern Application of Immunology to Therapeutics, 322 pages, illustrated. From the Medical Department of the Lederle Antitoxin Laboratories, New York, 1915. Price $1.00 postpaid.

An adequate knowledge of serum and vaccine therapy, their principles and practice, should constitute part of the mental equipment of every progressive physician and surgeon. While there is no lack of books on these subjects, most of them are too technical to be adapted for the needs of the average practitioner. The above work is a striking exception. It is written in a simple, clear, intelligible style, and the authors have succeeded in imparting in a concise and interesting manner a large amount of practical information. Part I is devoted to historic development of immunology; Part II to serum therapy; Part III to serum diagnosis; Part IV to vaccines in the prophylaxis of disease; Part V to vaccines in the treatment of disease, and Part VI to culture products. There are numerous excellent illustrations and the typography is admirable.

During the frequent long continuance of orthopedic conditions, acute manifestations of coincident affections present themselves, and these are met by the general practitioner. It has always been my experience that the best ultimate results have been obtained when I remained in co-operation with the general practitioner.—Dr. H. A. Wilson (*Therapeutic Gazette*).

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Editorial Department

NEW YORK, DECEMBER, 1915

SURGICAL ADVANCES IN SPLENIC ANEMIAS.

The physiology of the spleen is still in many respects a mystery and it is therefore not surprising that much remains to be known in regard to its pathology. This organ has been described graphically as a blood-filter and as the graveyard of the red blood corpuscles; it is one of the sites of formation of leucocytes and plays a part in the metabolic and phagocytic processes of the body. That it is not essential to life is shown by the fact that its removal is not followed by any decided interference with health, so that it would seem that its functions can be transferred to and carried on by other glands. To assume from this, however, that the spleen is an unnecessary and obsolescent organ is not justifiable in view of what is known of its action upon the blood and its close relation to the liver. There is a growing tendency, indeed, to consider derangements of splenic functions as a prominent factor in certain diseases of the blood in which its noxious influence has not previously been suspected. This has resulted in a considerable broadening of the scope of splenectomy, which formerly was chiefly limited to the treatment of injuries, abscesses, cysts and other tumors of the spleen. There is a type of secondary, so-called splenic anemias associated with splenomegaly, comprising Banti's disease of young adults and children and the pseudoleukemic anemia of infants of von Jaksch, in which this operation has been very successful in effecting a cure or, at least, in prolonging life. In a most instructive article on "The Relation of the Spleen to Certain Anemias" (*Journal of the Indiana State Medical Association*, November, 1915) Dr. W. J. Mayo states that of the seventy-one splenectomies performed in the Mayo Clinic, twenty-nine were for definite splenic anemia, and that all of the patients recovering from the operation, with five exceptions, have remained quite well in spite of the fact that some were in the late stages of the disease. It is his belief that Gaucher's disease (large cell splenomegalia), which is closely associated with splenic anemia, can probably be cured by removal of the spleen. Another very interesting group of related conditions in which good

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results are reported from this treatment is represented by hemolytic jaundice, both the congenital and acquired types, and Hanot's cirrhosis of the liver. In five cases of hemolytic jaundice operated on in the Mayo Clinic the improvement obtained is described as most remarkable; the jaundice disappeared completely within four days, with complete restoration of well-being. It seems also probable that splenectomy will prove of value in Hanot's disease, and perhaps even curative in some cases. Owing to the frequent presence of an enlarged spleen in pernicious anemia and the striking improvement in the blood condition noted by Eppinger, Cabot, Mayo and others after its removal, there is good reason to believe that many cases of this hitherto intractable disease can be greatly benefited or even cured by timely operative intervention—that is, before permanent organic changes have made their appearance. Thus surgery bids fair to win new triumphs in a number of serious diseases which have proved little, if at all, amenable to medicinal therapeutics.

APPENDICITIS AND ITS SURGICAL TREATMENT.

It is an undoubted fact, that since operative measures have come into vogue in the treatment of appendicitis, a large number of lives have been saved which otherwise would have been sacrificed. Appendectomy, on the whole, has thoroughly justified its adoption. Whether this operation is sometimes performed when there is no pressing need, and whether it is ever advisable to remove the appendix as a means of prevention, are points upon which it is unnecessary to dwell here.

This much, however, may be said: that the appendix is not absolutely without function—an organ whose usefulness in the evolution of man has become nil. What its exact functions are does not seem to be definitely known, and, in any event, they are insignificant. G. Savini (*British Medical Journal*) refers to the current teaching that the appendix is a useless and dangerous organ which ought to be removed in every laparotomy. It has always seemed strange to him that an atrophying organ should present such a well-marked structure and so varied and abundant a pathology—points which do not occur in truly rudimentary viscera. R. Robinson (*Surgery*, 1914, p. 436) showed experimentally that the appendix is endowed with some digestive power on albuminoids and to a less extent on carbohydrates, secreting an acid liquid which stimulates the cecum and provokes contraction of its muscle. Perhaps the statement may be made without laying oneself open to the charge of confusing the point, that the appendix has slight functions, but that its loss is little felt, and that when inflammation with its probable dangerous sequelæ attacks it, operative measures should be promptly resorted to. Yet premature and unnecessary operations are greatly to be deprecated.

The surgery of appendicitis is hardly so satisfactory as a few years ago; that is to say, the mortality has risen somewhat, or, at least, has not decreased *pari passu* with the remarkable advance of modern surgery. J. B. Murphy states in *Practical Medicine Series*, 1915 (General Surgery) that the mortality of appendicitis is still too great, as is also that of peritonitis. It is far beyond that which timely and efficient surgical intervention affords. The present laxity in treatment appears to be due to the fact that the subject is not receiving that forceful attention in literature that it did ten or fifteen years ago. This accentuates the belief that every topic in surgery should be re-written by masters every five to seven years to prevent decadence in practice. Reports of the past year from certain hospitals show that the average mortality in appendicitis cases, under all operative methods and in all stages of the disease, is about 10 per cent., which is 400 to 500 per cent. more than the death rate should be. These are pregnant words, and coming from so great an authority cannot but emphasize the point that its surgical treatment is susceptible of a good deal of improvement.

In appendectomy, as in laparotomies in general, the surgeon aims at an incision giving free access to the viscus on which he wishes to operate, and leaving a scar so situated and supported as to reduce to a minimum the probability of hernia. The method employed by G. H. Eddington (*British Medical Journal*) about one hundred times seems to satisfactorily realize both aims. It consists in exposing the rectus, loosening it in its sheath, retracting it towards the mid line, and transverse division of the posterior sheath and peritoneum. After the appendix has been removed and the posterior sheath

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and peritoneum sutured, the rectus is allowed to fall back into its normal position and the anterior sheath and superficial wound closed.

A very important factor in the successful operative treatment of appendicitis is when to operate. Parker Syms (*New York Medical Journal*) thus enumerates the principal differences of opinion yet to be settled. 1. We are all agreed that operating in the interval stages is thoroughly safe; in this class death should not occur except when due to an unavoidable surgical accident. 2. We are all agreed that operation in the early hours of acute cases is thoroughly safe. 3. We are all agreed that operating in the very late stages is thoroughly safe. 4. We are not all agreed on the method and manner of operating: Some advocate a quick, definite procedure, removing the appendix and stopping the leak, thus removing the cause, making provision for drainage, inflicting as little shock and trauma as possible, and depending upon nature to work out a cure. The others, however, attempt to support nature by art and inflict undue trauma.

Syms' practice is borne out by his results. Among the cases operated upon by him there have been but ten deaths, only one of which occurred during the past ten years. In his opinion, the method of operating is a most important factor in determining the mortality rate. He has not found the time of operating so important a factor as Ochsner has been led to believe.

It would appear that in the successful surgical treatment of appendicitis two or three salient facts stand out: Of course, a correct diagnosis is a *sine qua non* of success and, as a rule, this is not difficult. When to intervene is the feature of the situation upon which it is not altogether wise to dogmatize. Syms' views appear sound and no one would go far wrong in following the lines of operative procedure suggested by him. The advice of Murphy that more attention should be paid to the surgery of appendicitis is apposite and wise. The disease has now lost its novelty and the interest in it has been to some extent dulled by newer operative methods introduced for the relief and cure of other conditions. However, the points not to be lost sight of are that appendicitis is fairly common, that unless treated in time the results are disastrous, and that it is amenable to surgery when the proper course is pursued.

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THE DOCTOR ON THE WITNESS STAND*

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The doctor on the witness stand bears a peculiarly complex relation to the cause of justice; he is at once a witness to a medical fact, an interpreter of medical phenomena and a judge of the soundness of medical theory as applied to those facts and phenomena. A witness in any other special branch of knowledge may be said to speak in terms of three dimensions with which the lay mind of a juryman is more or less familiar, whereas the medical witness must place before a jury the mysteries of life and death, of fourth dimensional dignity, and must reduce them to three dimensions if he would clarify rather than hopelessly cloud the issues. Let me see if I can illustrate this:

The pain which an injured man suffers is appreciable to a bystander, it is a tangible something which he himself has experienced and it evokes his pity, but the distorted and useless hand fills him with awe. The words "broken arm" convey nothing tangible or understandable to him, whereas to the trained mind of the doctor they embrace solution in the continuity of a bone and physical modification of the skeleton—unrestricted contractility of muscles with tension of one group and overstretching of another and interference with the lever control of the hand; rupture of blood-vessels and hemorrhage into the tissues with the anticipation of subsequent pressure effects on nerves of motion and sensation; general shock with vasomotor excitation accounting for the paleness of surface, and perhaps unconsciousness. And beyond all this he sees with his medical mind the forces of Nature at work repairing the injury; he sees the escape of blood cells into the tissues around the injury and the activity of the connective tissue cells forming new fibers to unite the broken fragments; the chemical activity of the body fluids dissolving

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the bone and stripping it away from its ends, so that the fibrous lacing and interlacing may sew together the broken fragments; he sees the nutritive forces at work so that gelatine may be formed and deposited in the fibrous union to serve as a bed for the later deposit of bone salts, and he sees the ultimate contraction of the scar tissue and the heaping up of the callus and the shortening of that bony structure, unless Nature's laws or the physician's skill in re-positioning and keeping apart the fragments prevent or limit it. All these things are as unknown to the lay mind as is the fourth dimension, and a technical explanation would only serve to confuse that lay mind. Yet the doctor on the witness stand may find that justice demands that a deformity which is dramatically displayed before a jury shall be shown to be, really, physiological evidence of a good and satisfactory and useful union in order that judgment rather than sympathy shall control its verdict, and while bearing witness to the fact that a deformity does exist and gives evidence of a pre-existing fracture, he must interpret that deformity in terms of physiological repair and in language which the lay mind will understand, for the jurymen have not had the benefit of medical training. For example, in an action in negligence a jury readily understood my analogy that the breaking of the shaft of a peddler's wagon was a fracture and the re-positioning of the fragments and fastening with twine was the reduction and fibrous union of that fracture; pouring over this some molten tar from a nearby roofing furnace and the pressing into this of gravel gave the jury a picture of the gelatinous and bony deposit, and the resulting enlargement or deformity appealed to the jury as a natural and beneficial result, and they evidently formed the conclusion that the repaired shaft would probably outlast the usefulness of the rest of the wagon and judicial damages took the place of sympathetic damages in their verdict.

Any doctor may be a witness to a medical fact, but there are many highly competent medical men who fall far short of satisfying the demands of a jury for clarity of interpretation. We must not feel that the dignity of our profession requires the stilted phraseology of the textbook; a headache is a headache to a jury, although I have heard it described in court as a cephalgia, and an erythema will confuse a jury where a rash will not. The simpler our language and the more homely our analogies and explanations the more surely will we reach the hearts and the minds of the twelve men and true.

It is the quasi-judicial character of the doctor when he appears on the witness stand that concerns us most; the very dignity of his order should impel him to tell the "truth, the whole truth and nothing but the truth," and he is false to his order and to himself when he permits his partisanship to mould his judgment and by trick and device attempts a miscarriage of justice. I am not in sympathy with those in the profession who believe that a doctor should not assist in the preparation of a medico-legal case; if a given statement of facts, after careful analysis, warrants an opinion which is favorable to a litigant who consults him I believe it to be the doctor's duty to so prepare the attorney that he may intelligently approach the examination of his own medical witnesses and the cross-examination of his adversary's. Not every attorney is a doctor and not every doctor is proof against taking advantage of an attorney's ignorance of medicine, as is evidenced by the fact that a doctor testified to an upward and backward dislocation of both bones of the forearm in a case where a woman was observed by me, while a junior medical student, immediately after an accident, and was found to be conscious and holding her forearm at right angles to her upper arm. In this case the doctor would have had the lawyer at an immense disadvantage and justice under his heel unless I had previously instructed the lawyer as to the formation and relation of the bones involved, and unless I had demonstrated the utter impossibility of the flexed arm, which I had observed, except by the use of external force and the probable fracture of the coronoid process of the ulna and extreme shock. This was a case where the defendant's medical adviser, who had rendered first aid to a contused elbow, died before the trial of the case, and the defendant had no competent medical witness of fact to present, and it was this manifestation of partisanship and unfairness on the part of a medical witness which prompted me to enter the field of legal medicine to do my part in correcting its abuses.

Having prepared a medical case and having trained the lawyer to try his own case and guard against surprise or deceit from his adversary, the doctor should approach the witness stand hand in

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hand with conscience; he should remember that he is entitled to the protection of the court in common with every other witness and is entitled to make his meaning clear. This does not mean that he may waste the time of the court with lengthy explanation of medical theories; it is his own judgment on those theories in the light of his reason and experience that is sought, and his methods of arriving at that judgment are immaterial and irrelevant; but where a question is asked which does not permit of a "yes" or "no" reply any more than the classical "Have you stopped beating your wife?" he should not permit himself to say that he cannot answer the question, but insist upon a division of the question or an explanation of his reply.

There are three types of medical witnesses who afford mental exercise for lawyers and humiliation for serious minded doctors; they are the hesitant who fears he may be found wanting and will not put a "punch" into his reply, but says "it may or may not be," the dogmatic type who launches his reply as if that settled the matter from Adam's birth to Gabriel's call, and the book-man who can quote volume, chapter and verse, and whose mind is so crowded with the opinions of others that there is not room for an individual opinion; then there is a fourth type which is fortunately passing out under a storm of ridicule, and that is the man who has little knowledge but a great string of hospital attachments which sets the jury wondering how he can spare time from their demands to earn a living for his family.

The hesitant witness should never presume to do more than state a medical fact and leave opinion evidence for men who have the courage of their convictions. It matters not how learned he may be, his presence clogs the wheels of justice; his pride will not permit a manly "I do not know," and his fear will restrain him from giving a real opinion and impel him to seek the middle of the road.

The dogmatic witness is a fool or a knave; either he has little knowledge and rushes in where wise men fear to tread, or he possesses much knowledge and more craft and is prepared to force his point and take liberties with the truth. In either case he is a menace to the cause of justice, and in either case a lawyer is at a great disadvantage if he be not prepared by his medical adviser to meet and master this type of witness. This is the type of witness who says that a railway accident, which results in a broken bone, is the proximate cause of a death from tuberculosis or pneumonia or typhoid six months later.

The book-man is the bane of the bench and bar; his familiarity with standard authors amounts to personal intimacy, and when he quotes an obscure work he is careful to cite some of the medical connections of the author to lend the work weight; he takes chances on the books being in court, and is reasonably sure that the lawyer will be unable in his hurry and by reason of his concentration on the conduct of the case to do more than glance through the paragraph quoted and will probably overlook the importance of qualifying sentences or the diametrically opposite opinion contained in the next succeeding paragraph; and if the unexpected happens and the lawyer proves well informed, he will squirm out of his difficulty with some such simple statement as that the book quoted by the lawyer is an old edition which usually silences the lawyer and leaves the doctor in possession of the field.

The laborer is worthy of his hire and when a doctor is asked if he has been or is to be compensated for his work as expert he should answer frankly "yes." There is no reason why he should give his time and knowledge gratis; neither the court nor the jury expects such altruism from any man, but if he would have his testimony worth while, if he would help us to remove the stigma from the medical witness, let him never enter a case upon a contingent basis; the moment a medical witness admits that he is interested financially in the outcome of the case his usefulness ceases and only luck will save him from exposure and contempt before he leaves the stand.

While a display of personal interest in the outcome of a case tends to destroy the force and value of the testimony of the medical witness, there are other attitudes of mind which raise the presumption in the jury's mind that the doctor is insincere, and among the most important of these are indifference to scientific unity and lack of common sense. Let me illustrate this:

A dear old lady was the victim of a cerebral hemorrhage, which affected the musculature of her right side, but within a year had subsided to some extent; her husband died and left her a comfortable fortune which some of her children wished

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to control and proceedings in incompetency were begun. I submitted that old lady to a three hours' examination with brief periods for rest and was amazed at the grasp of knowledge of things social, political, domestic and religious which she had manifested. She was unlettered, it is true, but her grasp of matters, ancient and recent, was remarkable, and I urged her children to discontinue the proceedings, but they refused. At the hearing one doctor who qualified as an examiner in lunacy stated that he had examined 25,000 people as to their mental condition and had never made a mistake, and he called her a senile dement. Another doctor who also qualified as an examiner in lunacy and supplemented this with a host of hospital attachments, stated that he had treated her for her cerebral hemorrhage, which was true (I took occasion to look up the only prescription he had ever written for her and found it called for Fellow's syrup of hypophosphites compound). He gave it as his opinion that everybody over sixty years of age had more or less senile dementia (incidentally the learned Court was dangerously near sixty) and that the woman was a senile dement, and he made his diagnosis on the basis of these two phenomena—that she had wiped her nose on her gingham apron and had taken a drink of water from a tin dipper at the sink. His concept of scientific unity was so vague that he never stopped to apply the common sense rule to the case and learn that she was a woman of simple and homely habits living in an environment where these acts were the rule rather than the exception, and that she was showing a perfect sympathy with her environment, which is, after all, the only true test of sanity, whatever the learned book-writers may say in their refinements of classification of the very fascinating subject of insanity. I took occasion to incorporate this idea of the relativity of irrational acts in an opinion which I wrote for an Oregon lawyer, and the Appellate Court of Oregon agreed that it was common sense when they decided the incompetency proceedings which he was pleading.

Again, a man was caught immediately after he murdered two men; needless to say his defense was insanity. My duty was to train the district attorney in the case, and for a while I was in doubt as to whether alcoholic or epileptic insanity was to be the classification, but the diagnosis finally settled down to that classical type of manic-depressive which has been served up to us in this State *ad nauseam* in a series of trials and proceedings covering the past decade. The medical witnesses in their observations had the defendant manifesting exaltation of mind and rapidity of speech and motion, alternating with depression of mind and sluggishness of speech and motion, a half dozen times in the course of an hour, and the doctors were not men of inferior reputation, either. The real exhibition of scientific unity and common sense as they understood it, however, was in this—that as an evidence of delusion this man had performed a religious act and then threatened to convert this religious act into a sacrilege by doing insult to a sacramental the next morning, and to make the sacrilegious act more dramatic he *did* on the next morning cast the sacramental into a foul stream several miles away from his home, although twenty-four hours had elapsed between the threat and its consummation and although eight of those hours had been spent in restful sleep. All of this, it would seem, showed a premeditation, concentration, recollection, determination and consummation as nearly normal as any one could wish; at least the jury seemed to think so, for, while they disregarded the medical testimony which was brilliantly analyzed by the district attorney in summing up, their common sense prompted them to accept the lay testimony of his alcoholic habits and they convicted him of murder in the second degree.

Perhaps the most glaring exhibition of indifference to scientific unity and lack of common sense was in the case of a medical interne who was sued for breach of promise of marriage by an adventuress, who also brought proceedings to vacate the young doctor's diploma. This was not before a jury of laymen, but a commission of three grave and reverend doctors of medicine who represented the licensing power of the State. The woman had had a double oophorectomy and salpingectomy and curettage, as well as ventral fixation of the uterus, and implantation of a small section of the ovary in the soft tissues. These operations were all done on the first of January, and the proceedings were based on the allegation that on the 1st of April next following, this doctor had betrayed her; that on April 5th (four days later) a menstrual period was due, and failing to arrive, the young doctor recom-

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mended hot hip baths, some compound cathartic pills and some fluid medicine which was claimed to be ergot, whereupon the woman was supposed to have aborted and because of the young doctor's alleged unethical activity the complainant "prayed, etc., that his diploma be vacated." When I analyzed the case for the young doctor and his counsel and discovered the absurdity of the situation I thought to save the woman's counsel embarrassment by suggesting a conference with his medical adviser on the merits of the case, but he went to trial and in the face of the hospital record, properly identified and interpreted, which demonstrated that a hopeless sterility existed after the operation, the learned medical judges took the view that the series of operations described could not be performed on any one person at any one time and would have recommended a forfeiture of the license but for the warning that their action would be reviewed on a writ of certiorari which stimulated them to search for scientific unity, blend it with common sense, and realize not only the absurdity of the woman's contention of fertility but the improbability of even an ordinary medical student expecting to consummate an abortion in the time limit specified in this case.

The ideal medical witness is one who carefully analyzes the group of facts submitted to him for consideration, and having consulted his refererce books, submits facts and theory to his judgment, forms his conclusion and then submits that conclusion to the contrary opinions which he has discovered in his reference. If his conclusions stand this test he prepares an opinion on the merits of the case and acquaints the lawyer with the arguments pro and con as he has met them, invites and answers queries from the lawyer, and incorporates the whole in a medical brief. Here his partisanship ends, and having acquainted the lawyer with the strong and weak points of the case, he leaves the legal case where it belongs, in the lawyer's hands. Then when he testifies he does so frankly and honestly; he is not responsible for the conduct of the case, therefore he volunteers no information from the witness chair that is not called for by the questions asked, and when he is cross-examined he jealously holds in check his personal equation so that he may be just in the exercise of his quasi-judicial function. If the question of opposing counsel calls for an answer which is prejudicial he answers it frankly, secure in the consciousness that he has warned the lawyer in the case of his weakness and that the responsibility for clearing up the point on re-direct examination rests with the lawyer. He respects the rules of the court and the dictates of courtesy, and does not project an answer to a question when the opposing counsel by word or gesture interposes an objection; he has a true story to tell and he maintains his composure when the opposing counsel seeks to annoy him; this dignity which makes him proof against annoyance of counsel impresses the court and jury with respect and confidence, and when he leaves the stand he will have enhanced his own reputation in the community and will reflect glory on his order. If the conditions require further advice and counsel he gives it quietly and with dignity, without showing undue zeal or interest lest the observing jury discount the favorable impression which his behavior on the stand left in their minds.

I am aware from my experience that large corporations in approaching claims for damages determine, first, the element of responsibility, and if that be absolute or nearly so, the policy is to adjust the claims out of court, and I know, too, that this policy is largely influenced by the tendency of juries to award damages upon the theory that the corporation is rich and will not feel the loss. While this is often the attitude of some of the jury, in my experience I have found that the average juryman is disposed to be fair, and if a medical witness for a defendant corporation or individual displays a practical knowledge of his subject and is prepared to deal fairly with the injury without manifesting undue partisanship in minimizing it; if his testimony be simple and his reasoning good; if his explanations are given as man to man rather than as superior teacher to an ignorant pupil; if his adherence to scientific unity be tempered with the application of the common sense of the man in the street, a jury will listen with respect, and when they retire to the jury-room for deliberation some of their number will have absorbed his arguments and will apply them to the merits of the case, and the result will be substantial justice as between plaintiff and defendant. Moreover if the lawyer in a case be prepared by consultation with his medical witnesses or with medical counsel so that he may expose before

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the jury the incompetency or dishonesty of the medical witness who would do violence to the cause of justice, a great step will have been taken to restore the medical witness to his place of dignity and usefulness before the courts.

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TREATMENT OF FRACTURES.*

By E. C. DOYLE, M.D., Seneca, S. C.

It is not my intention, in preparing this paper on the treatment of fractures, to go into an extended discussion of the relative merits of the various kinds of splints used; that is, whether the "fixed," such as plaster-of-Paris, starch bandage, gum and chalk, gutta-percha, leather, felt, etc., or the movable ones, such as ordinary fractures boxes, Cline's splints, Liston's, McIntyre's, etc., are to be preferred; to this may be added the inclined plane, extension by weight, support by sand bags, etc. They all have advocates and are useful in certain conditions.

The practitioner of medicine is frequently twitted by the legal profession and other outsiders of being able to bury his mistakes—not only of being able to, but of actually doing so. Fortunately, or unfortunately, this, I am sure, may occur unintentionally in protracted medical cases, such as typhoid, etc.; but fortunately, or unfortunately, I don't know which, this is not the case in fractures. For if you make a mistake in setting the fracture, such as to cause marked impairment of function or great deformity where it should not occur, that patient is a walking advertisement of your mistake just so long as he "hops" about in your community, and you may become subject to a suit for malpractice. More especially should this appeal to us as railway surgeons, for we, who have been connected with this work, know how prone some people are to sue the company, frequently without just cause.

In the recent past I have become somewhat afraid of fractures, yet on the whole I must say, though modestly, that I have been either successful or very fortunate, I don't know which, in their treatment. I have thought that a great amount of my fear has been brought about by the voluminous writings of our present day specialists on this subject, some teaching us to wire almost every case, others advising the use of screws, others of plates, etc. There seems to be almost as much confusion in some quarters at this time over the proper treatment of fractures as there was a confusion of tongues at the building of the tower of Babel. There seems to be no unanimity of opinion among those who are supposed to know; hence this "scrambling of eggs" in the mind of the general practitioner. Now it is very imperative to my mind that these teachers of surgery should reach some feasible compromise on this subject, or else quit "wind jamming" about it, and then the general practitioner would regain his lost confidence. This condition of affairs reminds me forcibly of the discussions which are said to have taken place a good many years ago by European surgeons; some applying a solid, firm dressing to a simple fracture as early as possible, while many English surgeons considered this was very dangerous.

After making a diagnosis—and let me say here, this is frequently very difficult, especially in children, without an anesthetic—and an x-ray, reduce at once unless there is some contra-indication. To my mind, however, there are frequently other matters of vast import to engage our attention before reduction and application of splints; there is nearly always injury to the soft parts, such as muscles and sometimes tendons and vessels, and frequently a considerable amount of extravasated blood which causes swelling and thus adds to the deformity. In these cases, if you hastily proceed to reduce and apply splints, you frequently add insult to injury by causing more pressure upon the vessels and nerves than in their present condition they will bear; in other words, you are committing a new traumatism on already traumatized tissue. If we proceed to apply tight bandages and fixed splints to the lacerated and bruised tissues, we need not expect good results, for we will almost surely get some impairment in the function of the limb. Therefore let us depart from this old idea, which is in the minds of the laity and of a goodly part of the profession as well, that all fractures must be set with lightning-like rapidity; where there is contusion, laceration, extravasation and swelling, wait until this subsides if it be a week or ten days.

The location of a fracture anatomically and the relation of the parts to one another must also always be borne in mind in the treatment. In some

* Read at twentieth annual meeting of Association of Surgeons of Southern Railway, Asheville, N. C., June 2-4, 1915.

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portions of the body, *e. g.*, near the knee-joint, we have the tissues surrounded and bound down by strong fascia, and when we have a fracture in these parts, with severe injury to the soft parts, we are impressed with its gravity, because here frequently on account of the tenseness and density of the fascia, the extravasated blood is not absorbed and a hematoma is developed. If this is left alone too long it may cause so much pressure on both the arterial and venous circulation as to produce muscular contractures as well as muscular degeneration, and thus the function of the limb is to a considerable extent destroyed. Then it is that the conscientious physician is confronted with the seriousness of the situation and does not object to intelligent help both by fellow-practitioners and the x-ray. After having obtained this help, again I say, wait a reasonable time for the exudate and swelling to disappear, and if it does not and the surface assumes that glistening, tense appearance and peculiar feeling which is difficult to describe, but once seen and palpated is never to be forgotten, then under aseptic conditions use a trocar; or if a hematoma has become organized, incise and lift it out. Of course, these clots are ordinarily absorbed by the leucocytes, but when this does not happen and the above condition develops, there should be no further delay, for tardiness may mean contracted muscles or an ankylosed joint.

After the soft tissues have been cleansed both internally (case of compound fracture) and externally, then reduction and fixation of the fracture should take place by extension, counter-extension, the different manipulations, etc. I will not speak of the numerous splints, fracture boxes, pulleys and weights, etc.; but there is one point I wish to lay stress on with every fiber of my being. I care not what splint you use, whether it be plaster-of-Paris, felt, or what not. Do not commit another traumatism on these tissues; in other words, do not irritate the skin with rough splints, and do not compress the vessels and paralyze the nerves with tight splints. Use well-padded splints, conforming evenly with the parts, and not too rigidly or tightly applied. In my judgment, always do at the first dressing what some surgeons are forced to do at a later one. Secure apposition of the fragments, but let not that apposition be too firmly fixed; let there be some slight latitude in movement between the bone ends from the first dressing, thus producing some friction and promoting the formation of lymph and the proliferation of the osteoblasts. If this be done, there will be fewer cases of non-union and excuses for Lane's plates, wires, screws, and what not, all of which, in my opinion, if they are to be of any service, must be employed by very adept hands.

I have used nails, and with very little success. Personally I prefer wood, cardboard, or some similar splint for the first dressing, or until most of the swelling has subsided, for if it is necessary to remove them this is much more easily done than in the case of plaster-of-Paris and some of the other splints. I make it a rule to remove the dressings in my fracture cases every few days and sponge the parts with alcohol or some other cleansing lotion, and begin at a fairly early day to gently massage the skin and adjacent parts.

In conclusion:

Reduce as early as the condition of the soft parts will allow. But do not hesitate to delay reduction if their condition forbids it.

Use plates, wire nails, etc., only as a very last resort.

Never have a fracture too firmly fixed, that is, with too great immobility; if this suggestion is heeded, plates, etc., will be very rarely if ever required.

Surgical Gleanings

Neural Surgery.—Dr. A. A. Law (*St. Paul Med. Jour.*, Sept., 1915) concludes from experimentation upon the lower animals and clinical observations that neural surgery has taken its place along with the surgery of the bones, blood-vessels and intestines—that by the same process of scientific elimination, definite established methods of procedure have become accepted—foremost among them being that of fascial tubulization.

Treatment of Uterine Fibroids by X-Ray.—Dr. G. E. Pfahler (*N. Y. S. Jour of Med.*, Sept., 1915), who has had an extensive experience in this line of work, presents the following conclusions: 1. Roentgen therapy must be looked upon as a very efficient adjunct to the gynecologist's armamentarium, and while I believe that the rays should be applied by the roentgenologist, he should at the same time work hand in hand with the gynecologist. 2. Deep Roentgen therapy stops the hemorrhage associated with uterine fibroids. This is followed by a gradual disappearance of the tumor. This atrophic process may extend over several years and

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continues long after the cessation of treatment. 3. The treatment of metropathic hemorrhage is almost uniformly successful. 4. Uterine hemorrhage occurring at the menopause, when not malignant, will usually respond very quickly. There should be an increase in weight and an improvement in the blood condition following treatment, and when this does not occur suspicion of malignancy should be aroused (Albers-Schönberg). 5. Some good results can be obtained in inoperable carcinoma. The deep Roentgen therapy should be especially recommended as post-operative treatment in all cases.

Death from Hemorrhage Following Peritonsillar Abscess.—Dr. T. E. Carmody (*Col. Medicine,* Sept., 1915) reports a case of this kind in a child three years old. The first hemorrhage occurred on the 12th day of an attack of acute follicular tonsillitis, the abscess having ruptured spontaneously. The author advises that all such cases should be carefully watched, and the abscess opened when pus is found to be present. For the past eight years he has employed a method resembling that lately described by Killian and Hays. This operation is performed preferably with angular forceps, but may be accomplished with a straight forceps. The instrument is introduced from the opposite side of the mouth with the point extending between the anterior and posterior pillars at their junction and between the plica and the tonsil, and forced upward, outward and backward, thus entering the supratonsillar fossa where it will most likely encounter pus. If the forceps is then opened and withdrawn the pus will be seen to follow between the blades and will continue to discharge through this channel. We may, however, fail to find pus in the supratonsillar fossa, and in this case the forceps should not be withdrawn, but made to sweep down into the posterior fossa, and failing to find it there, into the anterior fossa, but this latter is seldom necessary. The advantages of this method are: 1. The opening is made at the actual point for drainage, i. e., at the most dependent portion of the abscess. 2. The opening can be made wide enough so as not to close easily. 3. No muscle fiber or mucous membrane is cut. 4. A dull instrument is used and there is no danger of wounding a vessel.

Divulsion of the Pylorus.—Dr. J. E. Engstad (*Jour.-Lancet,* Sept. 15, 1915) has for a number of years employed a simplified method of divulsion of the pylorus in cases of spastic contractions and constrictions due to pathological changes causing partial stenosis. His procedure is as follows: The index finger of the left hand is inserted into or against the proximal side of the duodenal gut about an inch from the ring, pushing the anterior wall of the bowel up and against the sphincter ring, while, with the right hand, this part of the stomach is held firmly against the forefinger of the left hand in such a way that the finger will enter the ring, like a gloved member, inside the invaginated part of the duodenum. This part of the operation must be done as carefully and gently as possible, so as to avoid traumatization of the bowel. After sufficient opening of a diameter to admit the index-finger, the thumb is introduced in the same manner as was the index-finger. This will thoroughly dilate, and to a certain extent paralyze, the muscles of the ring. Gentle stretching of the ring by pulling at its narrowest portion, will also tend to enlarge its caliber. The use of gauze in supporting the organs is not advisable. A rubber glove with a slightly roughened surface is all that is necessary to obtain a firm hold on the slippery peritoneal surface. Where Gaylord's bands are present they should be severed after a complete survey of the abdominal contents. The operation is contraindicated where the stomach is bound down by adhesions, or where duodenal ulcer is found within two inches of the duodenal cap.

Bone and Joint Tuberculosis.—Prof. T. Kocher (*Deut. Ztsch. f. Chirurg.,* Bd. 134, Hft. 1-3) from a comparison of the older and newer methods of treatment concludes: 1. In cases in which it is possible to give a patient in the early stage of joint tuberculosis the benefit of open air and sunlight treatment under favorable environment it is our duty to adopt exclusively orthopedic and hygienic measures. 2. If, however, the patient cannot sacrifice the necessary time and money radical intervention is indicated, such as total excision of bones or resection of joints, or atypical operations, with the end in view always of complete removal of the local tuberculous focus.

Resection of Tuberculous Elbow-Joints.—Dr. O. Huber (*Deut. Ztsch. f. Chirurg.,* Bd. 134, Hft. 1-3) reports on 42 cases of this operation from the Kocher clinic at Bern, of which 12 are no longer alive. Of the remaining 30 cases 28 are in good health and 2 suffer with pulmonary catarrh. As to the results of resection, complete function was restored in 16 cases, while in 3 the arm is useful only for light work and in 4 of but slight service. Ankylosis occurred in 15 cases. Total resection was done 13 times and partial 14 times.

Treatment of Tuberculous Hip-Joint.—Dr. H. Stoller (*Deut. Ztsch. f. Chirurg.,* Bd. 134, Hft. 1-3) has collected 63 cases treated in Kocher's clinic from 1900-1913. The total mortality was 33.3 per cent. Radical operation was employed in 31 cases, non-radical procedures in 8, osteotomy in 6, while 18 were treated conservatively. A cure resulted in 33 patients (52.4 per cent.). It is the custom in this clinic to use conservative measures at the start; if no improvement occurs nor appears likely within an appreciable time radical operation is resorted to. This is also indicated for (1) profuse suppuration and rapid progress of the disease; (2) for extensive destruction of the bones, especially when the general condition is poor and becoming worse, provided the operation is not too hazardous; (3) for sharply localized tuberculous foci of the bones.

Treatment of Hand Infections from an Economic Viewpoint.—Dr. H. E. Mock (*Surg., Gyn. and Obst.,* October, 1915) presents a number of valuable conclusions based upon the treatment of

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1,600 cases of hand infections. To give the best results the treatment must include: 1. The proper preventive measures, especially the prophylactic use of tincture of iodine and the early reporting of all minor injuries. 2. The treatment of hand infections as a serious surgical condition from their inception, and whenever indicated the adoption of hospital treatment early. 3. The proper and early diagnosis of the type and nature of infection and the exact location of the pus. 4. A proper incision of the abscess in order to establish adequate drainage and yet not spread the infection to other spaces.

End Results of a Series of 300 Operations on the Gallbladder.—Dr. J. J. Buchanan (*Surg., Gyn. and Obst.*, October, 1915) concludes from his experience that: 1. Cholecystotomy is not a satisfactory operation, giving but 81.7 per cent. of ultimate cures, taking the cases as they come. 2. Cholecystectomy, it is believed, would not be a satisfactory operation if employed in all cases by operators of ordinary skill and perhaps even by the most skillful surgeons. 3. The personal equation enters so largely into this question that it must be conceded by the advocates of cholecystectomy as well as the followers of cholecystotomy (if any still exist) that the practice that is safe for one operator is unsafe for another. 4. As a surgeon's experience increases and as he honestly follows his cases and considers their condition he is more disposed to turn to cholecystectomy; and at the same time he should realize that the too hasty adoption of this course may be attended with an increase in his mortality list. 5. There is a field for both operations, and that surgeon will have most success who will not only consider the condition of the patient but estimate justly his own capabilities.

Operative Treatment of Fractures.—Dr. J. B. Lowman (*Pa. Medic. Jour.*, November, 1915) believes that in recent fracture of the shaft, when the conditions warrant it, plating is the ideal method and should be done at an early period. In all cases of thighs not properly reduced, its use gives a shorter convalescence and better functional results. Autoplastic bone grafting is the ideal method in all delayed union, false joints, and tubercular conditions, and in all fractures where proper reduction cannot be made and plates are a detriment.

Effect of Trauma upon Urogenital Tract.—Dr. W. L. Bremerman (*Urolog. and Cutan. Rev.*, November, 1915) emphasizes the following points in regard to injuries of the urinary tract: Remember that all injuries of the urinary tract are grave and may be followed by fatality. Do not forget that an early diagnosis is essential. Do not forget that watchful waiting is not always followed by the best results unless the surgeon is ready to operate at a moment's notice. Remember that frequently delays are particularly dangerous. Be sure to give the patient every chance for recovery by following the proper line of treatment. It must not be forgotten that all external injuries of the urethra and most internal injuries should be given the earliest possible treatment. Remember that urinary extravasation is a very serious complication and every method possible should be employed to direct the urine away from the tissues. It should be remembered that shock and prostration are usually due to hemorrhage and it is necessary to operate even in the presence of shock in order to hope for any kind of favorable results. Early operation after a proper diagnosis is the keynote for favorable end results.

Treatment of Uterine Cancer.—Prof. L. Prochownik (*Zentralbl. f. Gynaek.*, No. 35, 36, 1915) presents a statistical study which is of especial interest since it comprises the long period of 36 years (1877-1913). During the first part of this period (1877-1881) the treatment of cancers of the uterus was generally palliative; then, until October, 1913, radical operation was the method of choice, since which time radiotherapy has been employed systematically in his practice. Of the 521 cases upon which the author bases his conclusions 405 were treated by operation, an operability of about 60 per cent. There were no deaths among the cases of supravaginal amputation; 7½ per cent. among those of carcinoma of the fundus; 11 per cent. among those operated on by the vaginal route, and 20.3 per cent. among those in which the abdominal operation was performed. Metastases following operation were observed in only two instances. The end-results (over five years) were as follows: Supra-vaginal amputation, 65 per cent.; vaginal removal of cancers of the fundus, 71.4 per cent.; in all those operated on per vagina, however, only 13.4 per cent., and excluding the number of operative fatalities, 15 per cent. In the cases of abdominal hysterectomy the percentage of permanent cures was 16.2 to 21 per cent.

Rectal Anesthesia in Thyroidectomy.—Dr. W. Lathrop (*Pa. Medical Journal*, November, 1915) recommends Gwathmey's method of oil-ether colonic anesthesia in goiter work. He has operated upon one hundred and eleven cases of goiter (hyperthyroidism, 15; parenchymatous, 38; colloid and cystic, 58) from June, 1914, to September 9, 1915, under this anesthesia, and from his experience with a large number of these operations, before adopting it, he is convinced that we have an ideal method and one superior to that by inhalation. The advantages of this method are: 1. It is most valuable in head and neck operations. 2. There is no fear, as is so often seen in the usual method. 3. The pulse and respiration, as a rule, remain near normal, or do not vary much from their condition when the operation was commenced. If rapid, as in hyperthyroidism, it remains rapid but does not increase as when fear has added to the apprehension of the patient. 4. There is less tax on the lungs and kidneys. 5. Operations can be done without the knowledge of the patient, which is surely valuable, and must play some part in anoci-association, while Crile's technic can be carried out if desired.

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